CHAPTER 4

ADVANCED BASE PLANNING AND EMBARKATION

Learning Objective: Recognize the principles involved in the use of the Facilities Planning Guide and identify procedures used in preparing material and equipment for embarkation.

The Advanced Base Functional Component (ABFC) system was developed to provide support facilities to constantly changing tactical and strategic situations. A modular or building-block concept was developed. Components were needed that would incorporate personnel, materials, equipment, and facilities. These components were designed and developed to fulfill specific functions, no matter where the components were placed. The Navy ABFC system is based on early experiences in advanced base planning and shipment used in World War II. Additional improvements were adopted from experiences learned in Korea, Vietnam, and the Persian Gulf.

ABFCs are normally complete entities. The basic groupings of the ABFC system are (1) component, a complete unit; (2) facility, a portion of a complete component; and (3) assembly, a portion of a facility. ABFCs, though normally complete, may not be supplied with housing, messing, medical facilities, maintenance facilities, defensive ordnance, communication equipment, and utilities with each component. These service components or facilities are to be integrated into an overall base development or augmentation plan. The ABFC system consists of two general-purpose publications: *Table of Advanced Base Functional Components with Abridged Initial Outfitting Lists,* OPNAV 41P3A, and *Facilities Planning Guide,* volumes 1 and 2, NAVFAC P-437.

ABFCs are assigned descriptive names to indicate their functions and alphanumeric designators to facilitate reference. A detailed advanced base initial outfitting list (ABIOL) is an itemized line-item printout of the material in each ABFC. Each system's command or bureau is responsible for maintaining a detailed listing of that part of the ABIOL assigned to it.

This chapter discusses use of the *Facilities Planning Guide,* NAVFAC P-437, which is an advanced base planning document. This chapter will provide you with guidelines for a system of preparing material, equipment, and personnel for embarkation.

FACILITIES PLANNING GUIDE

When tasked to assist in planning the construction of an advanced base, you should consult the *Facilities Planning Guide.* This FPG document identifies the structures and supporting utilities of the Navy ABFC system. This system was developed to make pre-engineered facility designs and corresponding material lists available to planners at all levels. While these designs relate primarily to expected needs at advanced bases and to the Navy ABFC system, they also can be used to satisfy peacetime requirements. Facility, logistic, and construction planners will find the information required to select and document the materials necessary to construct facilities.

The NAVFAC P-437 consists of two volumes. Volume 1 contains reproducible engineering drawings organized as follows:

Part 1, Component Site Plans, indexed by component and ABFC designation

Part 2, Facility Drawings, indexed by facility number and DoD category code

Part 3, Assembly Drawings, containing assembly information and indexed by assembly number

Each drawing is a detailed construction drawing that describes and lists the facilities, assemblies, or line items required to complete it. A summary of logistic, construction, and cost data is provided for each component, facility, and assembly of the ABFC system. A component is defined as a grouping of personnel and material that has a specific function or mission at an advanced base. Whether located overseas or in CONUS, a component is supported by facilities and assemblies.

A construction network is included in each facility of the ABFC system as part of the design package in the NAVFAC P-437 (fig. 4-1). The network includes such information as tool kits, equipment, and PRCP skills required for each facility. Time and effort are saved by using the construction networks that were developed for each facility in the ABFC system. To benefit from the construction networks, you must have an understanding of the basic principles and assumptions upon which the networks are based. Network analysis procedures for precedence diagraming are contained in chapter 5 of the *Seabee Planner's and Estimator's Handbook,* NAVFAC P-405, and chapter 2 of this TRAMAN.

Volume 2 of NAVFAC P-437 contains the detailed data display for each component, facility, and assembly. (Except for earthwork, material lists in volume 2 are complete balls of material.) It also is arranged in three parts.

Part 1 lists and describes by DoD category code the facilities requirement for each component.

Part 2 lists and describes by assembly number the assembly requirement for each facility.

Part 3 lists line-item requirements by national stock number (NSN) for each assembly.

The P-437 also contains other useful information for planners, such as crew sizes; man-hours by skill; land areas; amounts of fuel necessary to make a component, facility, or assembly operational; and information about predesigned facilities and assemblies that are not directly related to components shown in the ABFC table (OPNAV 41P3A). These predesigned facilities and assemblies give the planner alternatives for satisfying contingency requirements when the callout of a complete component is not desired. To make the P-437 compatible with other DoD planning guides, *Category Codes Facilities,* NAVFAC P-72, a related publication, establishes the category codes, nomenclature, and the required units of measure for identifying, classifying, and quantifying real property. The cardinal category codes are as follows:

100 Operations and Training

200 Maintenance and Production

300 Research, Development, and Evaluation

400 Supply

500 Hospital and Medical

600 Administrative

700 Housing and Community Support

800 Utilities and Ground Improvement

900 Real Estate

If a facility is required for enlisted personnel quarters, for example, it will be found in the 700 series (Housing and Community Support). The assemblies within each facility consist of a grouping of line items at the NSN level which, when assembled, will perform a specific function in support of the facility. An assembly is functionally grouped in such a way that the assembly number relates to the Occupational Field 13 (Seabee) skill required to install it. The groupings are numbered as follows:

Description	Number Start	Sequence Stop
Builder (BU) oriented	10,000	19,999
Utilitiesman (UT) oriented	20,000	29,999
Construction Electrician (CE) oriented	30,000	39,999
Steelworker (SW) oriented	40,000	49,999
Equipment Operator (EO) oriented	50,000	54,999
Waterfront equipment	55,000	57,999
Underwater construction and diving equipment	58,000	59,999
Operational supplies	60,000	62,499
Operating consumables	62,500	64,999
NBC warfare	65,000	67,499
Personnel-related supplies	67,500	69,999
Unassigned at present	70,000	79,999
Shop equipment including maintenance tools	80,000	80,999
Unique ABFC tool kits	81,000	81,999
Naval Construction Force (NCF) Table of Allowance (TOA) construction tools and kits (power tools)	82,000	82,099
NCF TOA construction tools and kits (electrical)	82,500	82,599
NCF TOA construction tools and kits (miscellaneous)	83,000	83,199
NCF TOA construction tools and kits (rigging)	84,000	84,099
Shop equipment (ABFC unique)	85,000	87,499

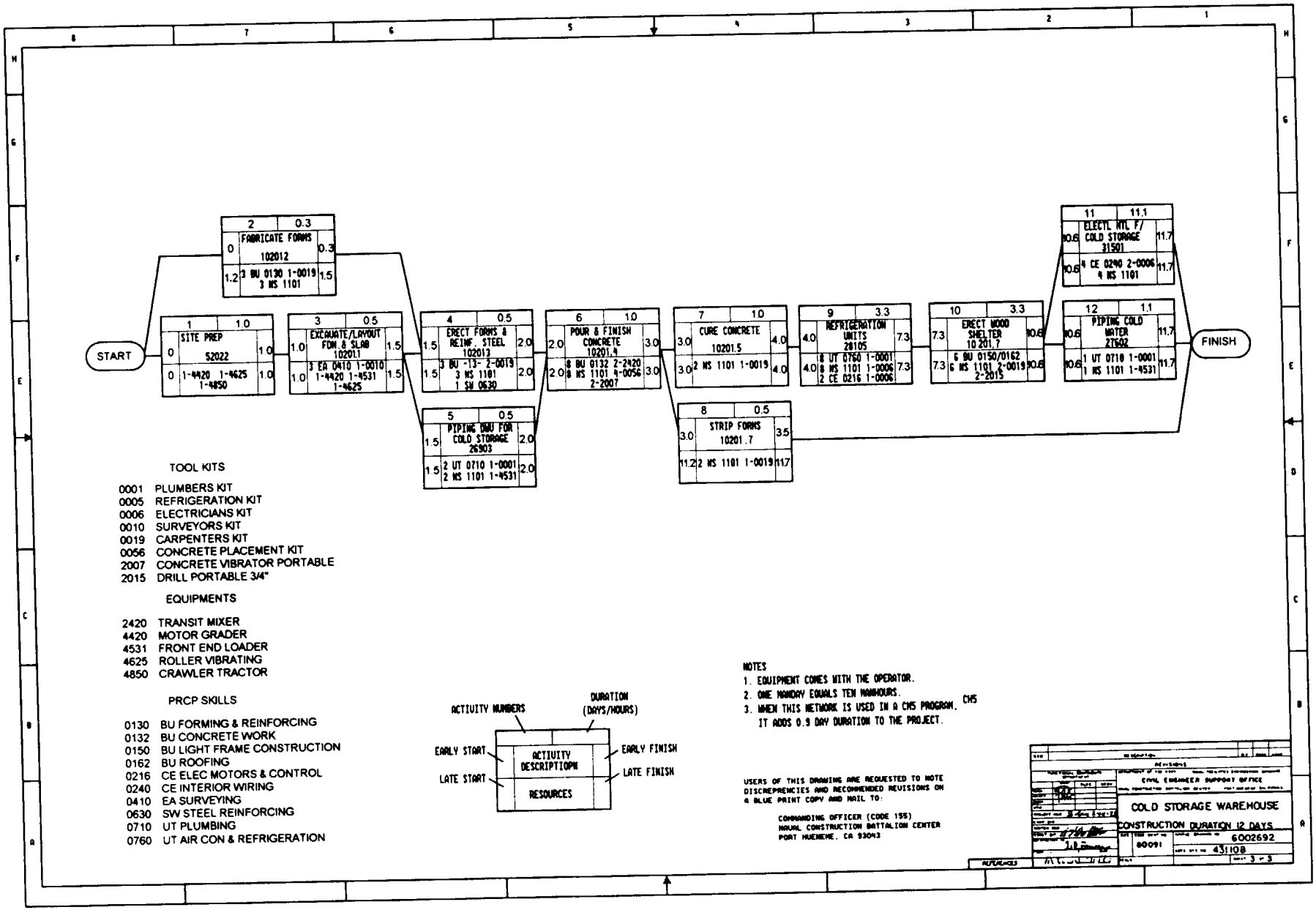


Figure 4-1.—Construction network.

TAILORING COMPONENTS AND FACILITIES

When you are using the ABFC system, remember that tailoring it to serve your specific needs is possible. Know your exact mission and requirements. Choose the components, facilities, or assemblies that best fit or can be tailored to meet your desired goals. Modular elements can be developed to serve similar functions in various locations. The exact requirements for a specific base cannot be defined, economically designed, nor supported within the general system. However, the base development planner knows the specific location, mission, unit composition, and availability of other assets. The planner can then select from the ABFC system the components or facilities that satisfy these specific requirements. Tailoring is then applied to the preplanned ABFC assets to come up with what is needed.

Components or facilities can be tailored by (1) deleting or adding facilities or assemblies and (2) specifying requirements for the Tropical or North Temperate Zone. Assemblies required only in Tropical installations are coded with the letter *T* in the zone column to the right of the assembly description. Assemblies required only in North Temperate installations are coded with the letter *N*. Uncoded assemblies are common to both zones.

USE AND APPLICATION OF THE FACILITIES PLANNING GUIDE

Although a listing in the P-437 may help you order individual items in general supply, it does NOT replace stock lists of systems commands or bureaus, offices, single managers, or inventory control points. Stock numbers and descriptions can be verified through appropriate stock lists. You are responsible for verifying stock numbers when ordering a component, facility, or assembly.

Component

Figure 4-2 shows a typical component breakdown of the P25. A brief header describes the mission and

COMPONENT P25 SEP 15 88

NAVAL MOBILE CONSTRUCTION BATTALION

PROVIDES PERSONNEL, ADMINISTRATION, SUBSISTANCE, EQUIPMENT, AND MINIMAL HOUSING REQUIRED FOR THE MOBILIZATION OF ONE MOBILE CONSTRUCTION BATTALION.

SITE PLAN 6027643 MAJOR REV 06 11 85

FACILITY	DESCRIPTION	FACILITY CAPACITY	QTY	COMPONENT CAPACITY	WEIGHT SHORT TON	CUBE MEAS TON	DOLLAR VALUE	CONST EFFORT MAN-HOURS
123 10T	POL STOR-DSPNSG FACIL 20000 GAL	1 OL	2	2 OL	3.8	9.0	51,515	470
143 45AD	ARMORY SMALL (TRICON)	100 SF	2	200 SF	.0	.0	0	0
143 45AE	ARMORY CONTAINERIZED-STANDARD 20	160 SF	2	320 SF	.0	.0	0	0
214 20N	A CD AUTO/CONST EQUIP MAINT SHOP	4000 SF	2	8000 SF	7.3	16.0	54,146	210
219 10J	B C AND D COMPANY SHOPS MINIMAL	5024 SF	1	5024 SF	4.2	10.1	30,143	85
219 10P	CENTRAL TOOL ROOM 16X32 TENT	512 SF	4	2048 SF	2.0	6.8	18,539	32
441 10B0	STORAGE/SUPPLY/SPARE PRT 16X32 TENT	512 SF	5	2560 SF	2.0	7.0	11,858	30
530 10RD	MEDICAL-DENTAL/FIRST AID	1024 SF	1	1024 SF	1.3	4.4	8,184	40
610 10V	ADMINISTRATION OFFICE TENT	512 SF	6	3072 SF	3.0	9.6	15,448	48
722 10RD	GALLEY MESS FLD BOOM F/RAPID DEPL	800 MN	1	800 MN	8.3	25.6	85,791	265
723 20JA	HEAD 4-HOLE BURN OUT W/LATRINE	336 SF	17	5712 SF	27.2	45.9	17,570	0
723 61C	SHOWER BATH UNIT POTABLE 9 HEAD	1 EA	4	4 EA	4.0	33.8	47,386	116
725 10A0	AIR DEF TENT CAMP FACILITY	4608 SF	1	4608 SF	10.7	29.9	50,571	334
725 10J	TROOP HOUSING EMERGENCY 16X32 TENT	512 SF	53	27136 SF	26.5	84.8	136,458	424
730 40H	LAUNDRY SKID-MOUNTED	280 SF	1	280 SF	.4	1.7	21,217	8
811 10R	ELEC PWR PLANT DSL 2-200KW W/O TANK	400 KW	1	400 KW	.7	1.3	22,737	5
812 30DP	DISTR CTR PORT 480-208/120V 30KVA		10		7.0	12.0	129,628	30
812 30PE	ELEC DISTR LINE 1000FT #6AWG	250 LF	2	500 LF	.2	.6	1,486	22
812 30PF	ELEC DISTR LINE 1000FT #1 EXPED	250 LF	2	500 LF	.2	.4	2,401	40
812 30PG	ELEC DISTR LINE 1000FT 250MCM EXPED	250 LF	10	2500 LF	7.0	9.0	31,017	670
812 30PK	DISTR CTR PORT 208/120V 30A 3PH		4		.4	1.2	9,053	8
812 30PL	DISTR CTR PORT 480-208/120V 15KVA		4		2.0	4.8	56,922	8
812 30Z	ELEC DISTR SPLC ENCL LARGE		2		.6	3.4	4,260	56
841 10M	WATER TREATMENT FACILITY 1500 GPH	30 KG	2	60 KG	9.0	15.2	101,187	38
841 40E	WATER STORAGE POTABLE	30000 GA	2	60000 GA	6.0	10.6	48,473	166
872 10R	SECURITY ANCHORING FOR TENTS		10		.0	1.0	1,672	0
872 10Y	SECURITY FENCE BARRIER (2000 FT)	2000 LF	3	6000 LF	9.3	8.1	6,720	216
872 10Z	SECURITY FENCE BARRIER (2000 FT)	2000 LF	5	10000 LF	17.5	40.5	21,352	1,200
872 200	BUNKER COMMAND POST	1 EA	3	3 EA	31.2	33.6	19,035	2,679
	TOTAL NORTH (TEMPERATE)				191.7	415.3	1,004,769	7,200
	TOTAL TROPICAL (BASIC)				181.9	395.0	958,266	7,044

COMPONENT P25

CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA CONNECTED	POWER KVA DEMAND	WATER GPD	SEWER GPD	FUEL GAL/30 DAYS HEATING DSL	FUEL GAL/30 DAYS HEATING MOGAS	FUEL GAL/30 DAYS PWR GEN DSL
INIT	6	53.0	236	178	19,000	15,800	37,884	698	0

SKILLS MAN-HOURS	EA	BU	UT	CE	SW	ED	CM	NS
	145	1,229	351	633	604	546	0	3,728

Figure 4-2.—Component.

capabilities of the component. The site plan pertaining to each component is depicted by a NAVFAC drawing number. However, drawings in volume 1, part 1, are indexed by component designation, not drawing numbers. The word *NONE* appears for components that have no site plans. The facilities required to make the component operative are listed in numerical sequence by DoD category code. The alpha suffix for each facility designator indicates differences between sizes, types, or layouts of facilities with the same functional purpose. Facility capacity is expressed in terms of the units of measure used in the *Category Codes Facilities,* NAVFAC P-72. The component capacity is figured by multiplying the facility capacity and the quantity. Weight and cube are measured in normal units for export packing. Weight and construction efforts are computed using the *Seabee Planner's and Estimator's Handbook,* NAVFAC P-405. Average construction conditions are assumed and computations are based on normal Seabee skill levels.

You compute the total of the weight, cube, and dollar value columns by adding all facilities or assemblies required in both tropical and northern climates plus the unique requirements for either tropical or northern areas.

Summary data located below the component facility listings provides information on the following:

1. Construction standards (CONST STD) taken from *Joint Chiefs of Staff (JCS),* publication 3, are grouped into two classifications: initial and temporary, Initial (INIT) is a duration requirement of less than 6 months. Temporary (TEMP) is a duration requirement of from 6 to 60 months.

2. Days of construction duration (LAPSED DAYS) are based on job requirements, optimum construction crew size, and full-material availability.

3. Often the land requirements (LAND ACRES), based on the assumed plot plan, will not be followed exactly because of terrain or existing buildings. The idealized plot plan was developed to design supporting utility systems. The information contained in the utility facilities has been increased to allow for variation in terrain.

4. The connected electrical load (POWER KVA) has been computed based on knowledge of ABIOL or TOA contents. A load diversity factor has been applied to compute the kVA demand.

5. Water and sewer (GPD) are based on ABIOL or TOA contents and the utility systems designed to this criteria.

6. Fuel usage (FUEL GAL) is computed on 30-day requirements for installed engine-driven or fuel-fired equipment only. No allowance for automotive, construction, weight handling, and other jobsite support equipment fuel is included. Fuel is not provided when facilities or assemblies are shipped. NAVSUP provides fuel as a contribution when whole components are shipped.

7. The skill requirements (SKILLS MAN-HOURS) are designated by Seabee (OF-13) ratings and are expressed in man-hours, as computed for each facility.

Facility

Figure 4-3 shows a typical facility entry in part 2 of volume 2—the electric power plant diesel 2-200 kW generators, without tank, facility 811 10R. Adjacent to the facility number, the heading shows the JCS planning factor applied. This planning factor is based on *Planning Factors for Military Construction in Contingency Operations,* Joint Staff Memorandum (MJCS) 235-86. The header also describes the basic capability of the facility. After the facility capability description is the NAVFAC drawing number. The drawing number is shown for reference purposes. All drawings in volume 1, part 2, are indexed by facility number.

The assemblies required to make the facility functionally operational are listed in assembly-number sequence. These numbers were derived from the prime trade involved in the construction. The 30,000 series indicates Construction Electricians. There is an exception to this numbering system. The exception is for Civil Engineer Support Equipment (CESE). CESE is identified by an equipment cost code (ECC). In this example, ECC 512801 is a 200-kW generator.

A brief description appears next, followed when appropriate by the code "N" for the North Temperate Zone or "T' for the Tropical Zone. Only assemblies required for Arctic operation are designated code "N." Other facilities or assemblies are designed for use in both North and South Temperate Zones and Tropical Zones. The quantity given is used as a multiplier, indicating the number of assemblies to be ordered. Weight and cubic feet are measured in normal terms for export packing. Weight, cubic feet, and dollar value reflect totals for each line.

FACILITY 811 10R PLANNING FACTOR (0.4-1.5)KW/MN SEP 15 88

ELECTRIC PWR PLANT DSL 2-200KW GEN W/CESE
W/O TANK

PROVIDES UP TO 400KW OF POWER AT 416Y/240 VOLTS
OR 208Y/120 VOLTS 3-PHASE.

NAVFAC DRAWING NUMBER NONE

MAJOR REV. 06 14 88

ASSEMBLY	DESCRIPTION	ZONE	QTY.	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE	CONST EFFORT MANHOURS
32064	SUPPORT EQUIP F/200KW GEN ECC512801		2	48.6	1.3	145.08	0
512801	GENERATOR 200KW		2	210.0	.0	988.80	0
32602	PANELBOARD ASSY 1200A WEATHERPROOF		1	1,157.7	48.1	21,533.17	4
32604	PARALLELING CABLE F/GENERATORS		1	4.0	4.0	69.72	1

	SHORT TON	MEAS TON				
TOTAL NORTH (TEMPERATE)	.7	1.3	1,420.3	53.4	22,736.77	5
TOTAL TROPICAL (BASIC)	.7	1.3	1,420.3	53.4	22,736.77	5

FACILITY 811 10R PRIMARY UNIT OF MEASURE 400 KW SECONDARY UNIT OF MEASURE 0

CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA CONNECTED	POWER KVA DEMAND	VOLTS	PHASE	WATER TOT. GPD	WATER PEAK GPM	SEWER GPD	RECOV. CODE
INIT	2	.00	0	0	0	0	0	0	0	A

FUEL (GAL/30DAYS)

HEATING DSL	HEATING MOGAS	PWR GEN DSL
0	0	0

SKILLS MANHOURS

EA	BU	UT	CE	SW	EO	CM	NS
0	0	0	4	0	1	0	0

Figure 4-3.—Facility.

Construction estimates are computed in the same manner as components, with the following exception. In addition to primary facility capacity, secondary capacity, as described in the NAVFAC P-72, is included. This is used, for example, in the 700 series of facilities where the primary capacity is expressed in personnel and the secondary, in square feet.

The recoverability code is a broad indication of the relocatability or recoverability. The code "A" indicates total recoverability, and "D" indicates a disposable facility. More details are found in table 4-1, Recoverability Code.

Assembly

Figure 4-4 shows a typical entry for an assembly. Assembly 32602 provides the necessary material for the installation of a 200-kW generator. Header information is the same as that for a facility. Assembly line-item requirements are listed by cognizance symbol and NSN. The unit of issue, weight, cubic feet, and dollar value are extracted from supply files once the requirement data is entered. This data changes often, but frequent changes are not made in the *Facilities Planning Guide* for stock numbers with minor price-level changes.

Ordering of Components, Facilities, or Assemblies

Components are usually ordered only under a mobilization situation and requested through the CNO. Facilities and assemblies can be ordered without CNO approval if reimbursement is provided. Requests for release are forwarded to NCBC, Port Hueneme. Attention is directed to the *Facilities Projects Manual,* OPNAVINST 11010.20 series (July 1985), regarding project approvals for peacetime use, and to *Relocatable Buildings, Procurement and Use of,* OPNAVINST 11010.33 series (October 1984), and DOTINST 4165.56 (April 1981), regarding the relocatable building program.

Index of Facilities

Suppose you have a requirement for an electrical distribution system underground. To determine what is available in the ABFC system to satisfy the requirement, look in P-437, volume 2, part 2, *Index of Facilities,* under the 800 series (Utilities and Ground Improvements), as shown in figure 4-5. If an approximate 11,000-foot system is needed, facility 81230AB can be used. Figure 4-6 gives the information you need to fulfill the requirement for an underground electrical distribution system.

Certain installed equipment or collateral equipment, such as furniture and fixtures contributed by others, are not furnished with the facilities or the assemblies listed in the P-437. You must request this equipment separately. The assembly listings indicate what is installed or what NAVFAC collateral equipment is provided.

EMBARKATION

A naval mobile construction battalion (NMCB), an amphibious construction battalion (PHIBCB), a construction battalion unit (CBU), or any other unit of the NCF must be ready to deploy or redeploy by sea, air, or land. NCF units must respond to an assigned mission by providing immediate support to Navy, Marine Corps, and other forces. Mobile units may also be required to perform disaster recovery operations.

Table 4-1.—Recoverability Code

A. Relocatable:	Designed for the specific purpose of being readily erected, disassembled, stored, and reused. Includes tentage.
B. Pseudo-relocatable:	Not specifically designed to be dismantled and relocated, but could be, with considerable effort and loss of parts. Rigid-frame building included.
C. Nonrecoverable:	A structure not designed to provide relocatability features or one where the cost of recovery of the shelter exceeds 50% of the initial procurement cost. Bolted tanks and steel bridges included.
D. Disposable:	Those temporary structures having low acquisition and erection costs, which are not designed for relocation and reuse and may be left on site or destroyed, such as SEAHUTS.

ASSEMBLY 32602 ZONE 32602

PANELBOARD WEATHERPROOF 480 VOLTS 3-POLE 3-WIRE
1200 AMPERE

NAVFAC DRAWING NUMBER 6002625 MAJOR REVISION DATE 06 11 85

COG	STOCK NUMBER	DESCRIPTION	UI	QTY	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE
9G	5975-00-152-1143	BOX CONN CA STR FOR 1N KO	EA	2	1.06	.0200	.56
9G	5975-00-878-3791	ROD,GROUND,3-3FT SECTIONS,5/8N DIA, STEEL,COPPER	EA	1	7.00	.0840	13.83
	1	CLAD,W/DRIVING STUD,GROUND WIRE CLAMP AND TERMINAL					
	1	LUG,AND 6FT NO.6 AWG BARE STRANDED COPPER WIRE					
9N	5999-00-257-7025	CLAMP GND 3/4 ROD 2-8 SOL	EA	1	.47	.0100	.43
2C	6110-00-213-8078	PANELBOARD,POWER DISTRIBUTION,PORTABLE,WEATHER-	EA	1	500.00	42.0000	20,317.00
	8	PROOF,400 KILOWATT,INPUT-480 OR 208 V.,3-PHASE,4-					
	8	POLE,5-WIRE,60 HZ,BUS CAPACITY-1200 AMPS,4-3 POLE					
	8	INPUT AND 8-3 POLE OUTPUT CIRCUIT BREAKERS.					
	8	APPENDIX E OF PD APPLIES					
9Z	6145-00-129-9320	WIRE COP SOL 6 AWG SOFT BARE	FT	15	1.20	.0225	1.35
9Z	6145-01-212-0272	WIRE ELECTRICAL #4/0 AWG EXPED	FT	600	648.00	6.0000	1,200.00
		ASSEMBLY 32602		TOTAL	1,157.73	48.1365	21,533.17

FUEL (GAL/30DAYS)

HEATING DSL	HEATING MOGAS	PWR GEN DSL	SKILLS MANHOURS EA	BU	UT	CE	SW	EO	CM	NS	CONST EFFORT MANHOURS
0	0	0	0	0	0	3	0	1	0	0	4

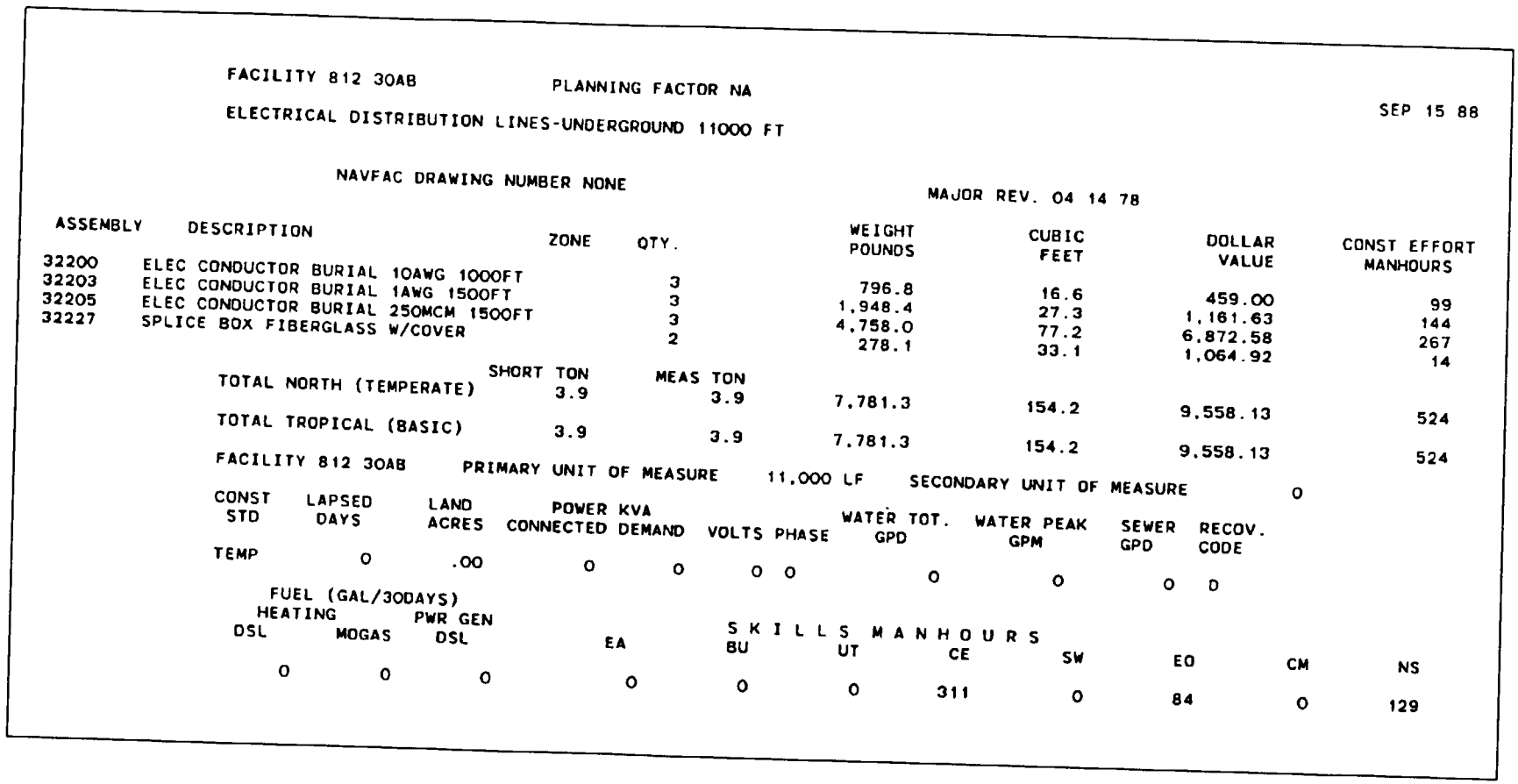
Figure 4-4.—Assembly.

INDEX OF FACILITIES
ALPHABETIC

JUN 15 90

FACILITY	DESCRIPTION	CAPACITY PRIMARY	CAPACITY SEC.	CAPACITY ARY	DRAWING	PAGE
811 10CH	ELEC PWR PLANT DSL 1-100KW W/PLMTNK	100 KW			6027582	
811 10AA	ELEC PWR PLANT DSL 1-15KW W/PLMTNK	15 KW			6139176	
811 10AE	ELEC PWR PLANT DSL 1-30KW W/PLMTNK	30 KW			6139175	
811 10AJ	ELEC PWR PLANT DSL 1-60KW W/PLMTNK	60 KW			6139174	
811 10TY	ELEC PWR PLANT DSL 2-100KW W/CESE	200 KW			NONE	
811 10AP	ELEC PWR PLANT DSL 2-100KW W/PLMTNK	200 KW			6139173	
811 10AB	ELEC PWR PLANT DSL 2-15KW W/PLMTNK	30 KW			6139176	
811 10R	ELEC PWR PLANT DSL 2-200KW W/O TANK	400 KW			NONE	
811 10AU	ELEC PWR PLANT DSL 2-200KW W/PLMTNK	400 KW			6139179	
811 10AF	ELEC PWR PLANT DSL 2-30KW W/PLMTNK	60 KW			6139175	
811 10AK	ELEC PWR PLANT DSL 2-60KW W/PLMTNK	120 KW			6139174	
811 10AR	ELEC PWR PLANT DSL 3-100KW W/PLMTNK	300 KW			6139173	
811 10CR	ELEC PWR PLANT DSL 3-100KW W/PLMTNK	300 KW			6027582	
811 10AC	ELEC PWR PLANT DSL 3-15KW W/PLMTNK	45 KW			6139176	
811 10AV	ELEC PWR PLANT DSL 3-200KW W/PLMTNK	600 KW			6139179	
811 10AG	ELEC PWR PLANT DSL 3-30KW W/PLMTANK	90 KW			6139175	
811 10AL	ELEC PWR PLANT DSL 3-60KW W/PLMTNK	180 KW			6139174	
811 10AH	ELEC PWR PLANT DSL 4-200KW W/PLMTNK	800 KW			6139179	
811 10BC	ELECTRIC POWER PLANT DIESEL 1-10KW	10 KW			NONE	
811 10CA	ELECTRIC POWER PLANT DIESEL 1-15KW	15 KW			6027585	
811 10CJ	ELECTRIC POWER PLANT DIESEL 1-60KW	60 KW			6027583	
811 10BD	ELECTRIC POWER PLANT DIESEL 2-10 KW	20 KW			NONE	
811 10CU	ELECTRIC POWER PLANT DIESEL 2-200KW	400 KW			6027581	
811 10CF	ELECTRIC POWER PLANT DIESEL 2-30KW	60 KW			6027584	
811 10BB	ELECTRIC POWER PLANT DIESEL 2-5KW	10 KW			NONE	
811 10CK	ELECTRIC POWER PLANT DIESEL 2-60KW	120 KW			6027583	
811 10CC	ELECTRIC POWER PLANT DIESEL 3-15KW	45 KW			6027585	
811 10CV	ELECTRIC POWER PLANT DIESEL 3-200KW	600 KW			6027581	
811 10CG	ELECTRIC POWER PLANT DIESEL 3-30KW	90 KW			6027584	
811 10CL	ELECTRIC POWER PLANT DIESEL 3-60KW	180 KW			6027583	
811 10CH	ELECTRIC POWER PLANT DIESEL 4-200KW	800 KW			6027581	
811 10CM	ELECTRIC POWER PLANT DIESEL 4-60KW	240 KW			6027583	
811 10P	ELECTRIC POWER PLANT DIESEL 5-200KW	1000 KW	2450 SF		6139179	
811 10TA	ELECTRIC POWER PLANT GED 5KW	5 KW			NONE	
811 45A	ELECTRIC PWR PLANT 2-750KW DIESEL	1500 KW			NONE	
812 30AB	ELECTRICAL DISTRIBUTION LINE-UGND	11000 LF			NONE	
812 30AD	ELECTRICAL DISTRIBUTION LINE-UGND	4200 LF			NONE	
812 30U	ELECTRICAL DISTRIBUTION LINES	2500 LF				
812 30CV	ELECTRICAL DISTRIBUTION LINES EXPED	2000 LF			NONE	
812 30CZ	ELECTRICAL DISTRIBUTION LINES EXPED	4000 LF			NONE	
812 30AE	ELECTRICAL DISTRIBUTION LINES-UGND	3500 LF			NONE	
812 30AF	ELECTRICAL DISTRIBUTION LINES-UGND	5000 LF			NONE	
812 30AT	ELECTRICAL DISTRIBUTION LINES-UGND	1875 LF			NONE	
812 30AX	ELECTRICAL DISTRIBUTION LINES-UGND	125 LF			NONE	
812 30BF	ELECTRICAL DISTRIBUTION LINES-UGND	250 LF			NONE	
812 30BG	ELECTRICAL DISTRIBUTION LINES-UGND	500 LF			NONE	
812 30BH	ELECTRICAL DISTRIBUTION LINES-UGND	5000 LF			NONE	
812 30BK	ELECTRICAL DISTRIBUTION LINES-UGND	4000 LF			NONE	
812 30BM	ELECTRICAL DISTRIBUTION LINES-UGND	2500 LF			NONE	
812 30BS	ELECTRICAL DISTRIBUTION LINES-UGND	7500 LF			NONE	
812 30CY	ELECTRICAL DISTRIBUTION LINES-UGND	1000 LF			NONE	
812 30E	ELECTRICAL DISTRIBUTION LINES-UGND	2000 LF			NONE	
812 30J	ELECTRICAL DISTRIBUTION LINES-UGND	875 LF			NONE	
812 30K	ELECTRICAL DISTRIBUTION LINES-UGND	750 LF			NONE	
812 30M	ELECTRICAL DISTRIBUTION LINES-UGND	2700 LF			NONE	
812 30P	ELECTRICAL DISTRIBUTION LINES-UGND	4000 LF			NONE	
812 30W	ELECTRICAL DISTRIBUTION LINES-UGND	750 LF			NONE	

Figure 4-5.—Alphabetical index of facilities.



FACILITY 812 30AB PLANNING FACTOR NA

ELECTRICAL DISTRIBUTION LINES-UNDERGROUND 11000 FT SEP 15 88

NAVFAC DRAWING NUMBER NONE MAJOR REV. 04 14 78

ASSEMBLY	DESCRIPTION	ZONE	QTY.	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE	CONST EFFORT MANHOURS
32200	ELEC CONDUCTOR BURIAL 10AWG 1000FT		3	796.8	16.6	459.00	99
32203	ELEC CONDUCTOR BURIAL 1AWG 1500FT		3	1,948.4	27.3	1,161.63	144
32205	ELEC CONDUCTOR BURIAL 250MCM 1500FT		3	4,758.0	77.2	6,872.58	267
32227	SPLICE BOX FIBERGLASS W/COVER		2	278.1	33.1	1,064.92	14
	TOTAL NORTH (TEMPERATE)	SHORT TON 3.9	MEAS TON 3.9	7,781.3	154.2	9,558.13	524
	TOTAL TROPICAL (BASIC)	3.9	3.9	7,781.3	154.2	9,558.13	524

FACILITY 812 30AB PRIMARY UNIT OF MEASURE 11,000 LF SECONDARY UNIT OF MEASURE 0

CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA CONNECTED	POWER KVA DEMAND	VOLTS	PHASE	WATER TOT. GPD	WATER PEAK GPM	SEWER GPD	RECOV. CODE
TEMP	0	.00	0	0	0	0	0	0	0	D

FUEL (GAL/30DAYS)

HEATING DSL	HEATING MOGAS	PWR GEN DSL
0	0	0

SKILLS MANHOURS

EA	BU	UT	CE	SW	EO	CM	NS
0	0	0	311	0	84	0	129

Figure 4-6.—Selection of facility from index.

CONTINGENCY REQUIREMENTS

To meet the requirements for contingency support of the Naval Task Force and the Fleet Marine Task Force, PHIBCBs and CBUs must be able to redeploy within 3 and 6 days, respectively. After 30 days in home port, other NCF units should be able to redeploy within 10 days. During the first 30 days after return to home port, each NMCB must be capable of deploying an air detachment within 48 hours. While deployed, NMCBs should be able to redeploy within 6 days. While en route to or from a deployment site, the units must be prepared for immediate diversion to emergency, contingency, or mobilization assignments.

EMBARKATION MOUNT-OUT

The NMCB is used in this chapter as a sample embarkation. These same basic methods of embarkation are used by the underwater construction teams (UCTs) and PHIBCBs.

For a smooth, expedient mount-out, careful planning and organizing are required. Embarkation, whether by air, land, sea, or any combination, is an all hands evolution where TOTAL support is mandatory for a successful move.

Organization charts for mount-out, staging area flow charts, CESE flow charts (both in the shop and to the staging area), pallet buildup, transport flow charts, and personnel flow charts/checklists are used in tracking the unit's progress throughout the embarkation evolution. Failure to maintain control and status may result in a unit not being able to meet its embarkation commitment. Pre-positioning of materials and maintaining the CESE in a constant state of readiness will help to effect a smooth, expedient mount-out.

EMBARKATION PLANNING

Embarkation is a joint undertaking by both the unit and the organization providing the lift. Proper embarkation depends on a mutual understanding of objectives and capabilities and full cooperation in planning and execution. Throughout the planning and execution of the embarkation phase, officers of the embarking unit will be working with their counterparts in other organizations. Early communication and coordination between the user and the organization providing the lift are extremely important.

The U.S. Air Force Airlift Mobility Command (AMC) is normally used when the lift is to be by air. AMC can furnish strategic airlift using the C-141/C-5B aircraft for long-range airlift or C-130 aircraft for tactical airlift. This capability allows for placement of the troops close to the trouble spot. The U.S. Air Force has developed the Computer-Aided Load Manifesting (CALM) system, the same system that is used by the NCF. The purpose of the CALM system is to provide standardized automated capability to design load plans. This system provides placement of mobility equipment, cargo, and personnel on military and Civil Reserve Air Fleet (CRAF) cargo capable aircraft. CALM provides a standard automated capability that edits and stores incremental data and produces load plans. CALM can be used in preplanning, exercises, or actual deployments.

Planning for embarkation includes all unit moves, regardless of the method used for movement. Movement methods are determined by the availability of transportation and the transportation requirements of the unit. In amphibious embarkation, there must be determinations of the overall shipping requirements and the embarkation schedules. These determinations are made at the OPNAV level in the chain of command to enable subordinate units to prepare detailed loading plans for individual ships. Planning requires constant coordination between Navy and Air Force leaders. Coordination and cooperation stem from a mutual understanding of the problems of each support group. In the final analysis, the embarkation plan must support the tactical deployment plan of the unit. And in the case of an amphibious landing, the embarkation plan must support the tactical plan for landing and the scheme of maneuvers ashore.

Embarkation planning requires detailed knowledge of the characteristics, capabilities, and limitations of ships, aircraft, and amphibious vehicles and their relationships to the troops, supplies, and equipment to be embarked. The planner must be familiar with transport types of amphibious ships, Military Sealift Command (MSC) ships, merchant ships, and cargo aircraft. MSC ships and merchant ships are not designed or equipped for, and do not have crews large enough for amphibious operations. These problems must be anticipated and resolved. Any additional requirements for hatch crews, winchmen, cargo-handling equipment, cargo nets, assault craft, or other facilities must be provided by the user.

PRINCIPLES OF EMBARKATION PLANNING

To ensure proper embarkation, it is mandatory that these four principles be observed in planning

embarkation of the landing force. Both ship amphibious operations and aircraft assault force support operations must observe the following embarkation principles:

1. Embarkation plans must support the plan for landing and the scheme of maneuvers ashore. Personnel, equipment, and supplies must be loaded in such a manner that they can be unloaded at the time and in the sequence required to support operations ashore.

2. Embarkation plans must provide for the highest possible degree of unit self-sufficiency. Troops should not be separated from their combat equipment and supplies. Thus, weapons crews should be embarked on the same ship or aircraft with their weapons, radio operators with their radios, and equipment operators with their equipment. In addition, each unit should embark with sufficient combat supplies, such as ammunition, fuel, and radio batteries, to sustain its combat operations during the initial period at the operational area. Each individual should have sufficient water and rations to last for 24 hours.

3. Plans must provide for rapid unloading in the objective area. This can be achieved by a balanced distribution of equipment and supplies.

4. Plans must provide for dispersion of critical units and supplies among several ships or aircraft. The danger of not doing so is obvious. If critical units and supplies are not dispersed, loss of one ship or aircraft could cause a loss of combat capability that might seriously jeopardize the mission.

EMBARKATION TEAM PLANNING

Effective embarkation team planning is dependent upon the early receipt of information from higher authority. Detailed planning begins with the determination of team composition and the assignment of shipping. The following factors are included in team embarkation planning:

- Designation of the team embarkation officer(s)
- Preparation and submission of basic loading forms by troop units of the embarkation team
- Preparation of detailed loading plan
- Designation of billeting, messing, and duty officers during the period of the embarkation
- Designation and movement of advance parties and advance details to the embarkation area
- Establishment of liaison with the embarkation control office in the embarkation area
- Preparation of the schedule for movement of troops, vehicles, equipment, and supplies to the embarkation area
- Preparation of plans for cargo security in the embarkation area

EMBARKATION PLAN

There are three basic embarkation plans that are normally prepared by the various command levels within the landing force. The landing force embarkation, the group embarkation, and the unit embarkation plans differ in preparation and content.

1. The landing force embarkation plan is prepared by the landing force commander. It includes the organization for embarkation; supplies and equipment to be embarked; embarkation points and cargo assembly areas; control, movement, and embarkation of personnel; and miscellaneous information. The landing force embarkation plan contains information that the embarkation group commander uses to prepare a more detailed plan.

2. The group embarkation plan is prepared by the embarkation group commander. It establishes the formation of embarkation units and assigns shipping or flights to each embarkation unit. While it contains the same basic information as the landing force embarkation plan, there is much greater detail. The group embarkation plan has attached or included within it the embarkation organization and shipping assignment table.

3. The unit embarkation plan is prepared by the embarkation unit commander. It establishes the formation of embarkation teams. It contains, generally, the same information as the group embarkation, but in even greater detail. Attached to the unit embarkation plan is the unit embarkation organization and shipping and/or flight assignment table. NCF units embarking alone and outside of the landing force, either by amphibious means or by air, should prepare an embarkation plan incorporating all of the data necessary for proper embarkation by the unit.

PRE-POSITIONED STOCKS AND SUPPLIES

Because of the mobile nature of the NCF, it is necessary to pre-position certain supplies and

equipment in anticipation of their use in contingency mount-outs. These stocks include oil, fuels, lubricants, rations, ammunition, and a full allowance of equipment. During a contingency mount-out, all or part of these pre-positioned stocks may be used. As part of the planning phase, NCF units should check the plan to determine the exact amount and types of supplies to be embarked and the location of the supplies.

Standard boxing procedures are required in an effort to minimize shipping, packing, and repacking of allowance items. Standardized boxing also helps to establish uniformity among the NCF units.

Present mobility requirements make it necessary to keep as much as possible of the battalion's TOA packed or partially packed for redeployment at all times. The best method of maintaining this state of readiness is to use packing boxes for day-to-day storage and for dispensing battalion allowance items. Each NCF unit must fabricate mount-out boxes according to COMSECOND/COMTHIRDNCBINST 3120.1 series. These fabricated boxes are for all the unit's TOA authorized allowance items that can be boxed. On-hand boxes may be used provided the color and marking codes conform with standard box markings.

You must prepare multiple copies of the packing lists for each box. One copy is placed inside of the box. One copy is mounted in a protective packet on the outside of the box. One copy is kept on file in the embarkation mount-out control center (MOCC). And one copy is retained by the department to which the supplies or equipment belong. Packing lists must contain sufficient details so you can locate items without having to open and search several boxes.

Consider the following when constructing mount-out boxes:

– Use screw nails or flathead screws and glue for assembly

– Bolt covers to tapped metal inserts (as shown in COMSECOND/COMTHIRDNCBINST 3120.1 series, or an equal type of bolting method)

– Customize box interiors to suit the contents

– Limit gross weight of the boxes to 250 pounds (for easy handling without material-handling equipment)

– Fabricate boxes of 3/4-inch exterior grade plywood, reinforced with 2 by 4 inch ends

– Create for large authorized items special boxes (must conform to the criteria set forth in COMSECOND/COMTHIRDNCBINST 3120.1 series)

– Install metal corners or other protection to prevent shipping damage

EMBARKATION PERSONNEL

To carry out their respective duties efficiently, no matter what level of the embarkation chain they are associated with, embarkation officers/staff must be familiar with the following:

- Naval and Air Force customs and terminology
- Applicable tables of organization, allowance, and equipment (within the TOA)
- Amphibious task force organizations and flight operations
- Landing force organization
- Supply and equipment classifications
- Standard operating procedures for loading, packing, crating, marking, and waterproofing supplies and equipment
- Ship's loading characteristics pamphlets (SLCPs)
- Loading and unloading time factors
- Amphibious ships, landing craft, amphibious vehicles, helicopters, and transport aircraft characteristics

STAFFING

Embarkation staff personnel must interface with other command embarkation staffs. Therefore, a brief description of the duties and responsibilities for each of the staffs is described in the following paragraphs.

COMSECOND/COMTHIRD Naval Construction Brigade Embarkation Staff

The COMSECOND and COMTHIRD NCB embarkation staff has the following duties:

1. Heads the embarkation section of the Readiness Department.
2. Reviews and updates current embarkation directives and instructions.

3. Obtains and maintains current tonnage tables of equipment and embarkation library references at Naval Construction Regiment (NCR) and deployment sites under their operational control (OPCON).
4. Obtains and maintains complete and current files of SLCP for amphibious shipping.
5. Obtains and maintains complete and current files on air-certified CESE.
6. Advises and assists subordinate embarkation staffs under their OPCON.
7. Prepares operational orders to exercise the battalion's embarkation plan while deployed.
8. Maintains constant liaison with other services and external organizations responsible for supporting the embarkation process.

Regimental Embarkation Staff

The training regiments under COMSECOND/ COMTHIRD NCB establish and maintain an embarkation section/office staffed according to the COMSECOND/COMTHIRDNCBINST 3120.1 series. The embarkation section ensures that current COMSECOND/COMTHIRD NCB embarkation instructions and directives are adhered to by the NCF units under their OPCON. The embarkation section ensures that a training program is established and used for training NCF personnel in all phases of embarkation for amphibious, air, and land operations.

The embarkation officer and staff consist of trained and experienced personnel who have successfully completed the formal embarkation school(s) listed in COMSECOND/COMTHIRDNCBINST 1500.20. Schooling is a prerequisite for personnel assigned to the embarkation staff.

The regimental embarkation officer, a Civil Engineer Corps (CEC) officer, is qualified in embarkation and directly responsible to the regimental commander. The regimental embarkation officer's duties and responsibilities include (but are not limited to) the following:

- Knowing the locations and general condition of all supplies and equipment assigned to the regiment to support NCF contingencies during the home port period.
- Ensuring the embarkation/MOCC files are kept current on all embarkation data.
- Maintaining liaison with COMSECOND/ COMTHIRD NCB embarkation staff.
- Ensuring that adequate files (such as SLCPs, aircraft data, TOAs, and road convoy data) are maintained in support of the NCF units.
- Ensuring that a training program is instituted and monitored by the regiment to train NCF personnel in all phases of amphibious, air, and land operations, and both tactical and nontactical embarkation.
- Heading the embarkation section assigned to the NCR Planning and Training Department.
- Preparing the organization for embarkation and assignment to the shipping schedule for approval by the embarkation unit commander.
- Assigning cargo assembly areas, vehicle staging areas, and embarkation points to subordinate elements or teams.
- Overseeing unit embarkation planning.
- Advising battalion or team embarkation officers in the preparation of loading plans.
- Coordinating all loading activities of subordinate embarkation echelons.

The regimental embarkation staff assignment is a primary duty assignment. The composition of the staff must be the same as the NCF units. Their duties and responsibilities are as follows:

- Maintain the serial element management system (SEMS) computer printouts (for ships), if used.
- Maintain the CALM system computer printouts (for aircraft), if used.
- Maintain a complete P-25 equipment template file, both 1/8-inch and 1/4-inch scale.
- Establish and maintain a training record file of all embarkation training.
- Maintain lesson plans for training and indoctrination of the NCF unit personnel involved in embarkation.
- Monitor and evaluate all NCF home port embarkation exercises.
- Maintain a file of all NCF embarkation exercises held in home port.

– Accomplish such other embarkation duties as may be necessary or assigned.

Battalion Embarkation Staff

The battalion embarkation officer and embarkation chief, when not actually engaged in the embarking process, are responsible for the following:

– Knowing the location and the general condition of all supplies, equipment, and vehicles assigned to the battalion.

– Keeping current the MOCC files relative to all embarkation data.

– Training sufficient personnel outside of the embarkation staff to perform embarkation functions during an actual mount-out.

– Ensuring that adequate files are maintained in the event of incapacitation or absence during an embarkation. Thus allowing the assistant to assume all duties with a minimum of lost effort.

– Conducting training for the embarkation staff to increase their proficiency in embarkation.

– Preparing and maintaining a template file of all current deployment site Tab A equipment attached to the battalion.

– Coordinating through the operations officer (S-3) all requirements associated with battalion movement.

– Validating DD Form 2327, Unit Aircraft Utilization Plan, with supporting airlift control element (ALCE) affiliate within 14 days of the arrival of the main body.

– Validate/update preliminary load plans (PLP) for deployment of air detachments and air echelons on C-130, C-141B, and C-5B type of aircraft within 30 days of the arrival of the main body. Criterion for PLP will be current Tab A, equipment list, and TOA materials and supplies.

– Validate the CALM system database as changes are received to the Tab A from the equipment officer (A6).

The battalion embarkation staff consists of a nucleus of trained, experienced personnel assigned to embarkation as a primary duty. This staff is augmented by company and departmental representatives serving on a collateral-duty basis. During an exercise or actual contingency mount-out, the full embarkation staff reports to the battalion embarkation officer. Then they assume full-time responsibility for embarkation within their assigned area of responsibility. In the case of an actual mount-out, the embarkation staff members continue to function on a full-time basis until landing of the troops, supplies, and equipment has been completed.

Each company/department having material that requires shipment should designate one responsible officer/petty officer to act as the embarkation representative for that company/department.

Details are expected to be able to rejoin and integrate into the main body on short notice. Detail OICs should maintain current military and commercial transportation schedules as part of their detail embarkation plan. Companies/departments at the main body should maintain contingency rosters integrating detail personnel back into their military organization. Plans for the details to join the main body en route to or at the new deployment site should also be considered.

All details should include in their embarkation plan the possibility of being tasked to respond as an advance party component of the battalion or to redeploy independently. The location and semi-independent nature of details provide ready capability. These small well-trained units are capable of responding quickly to a situation not requiring full battalion participation.

All detail sites are required to have rollback plans as stated in the NCF OPLAN. These plans are routinely reviewed as part of the training management assistance visit (MAV).

EMBARKATION TRAINING REQUIREMENTS

Embarkation aboard amphibious ships or cargo aircraft cannot be accomplished smoothly and efficiently without prior training and actual experience. Personnel must know their specific assignments, and they must know the proper way in which to carry them out. All personnel training must be geared to the level of skill required to embark the unit efficiently. For unit efficiency the accent must be on maximum training for the embarkation staff and loadmaster. When the embarkation staff is used in routine embarkation of supplies and equipment by air or sea to details and detachments, additional qualified personnel are required.

Formal Training

Formal embarkation schooling prepares only a small portion of the unit's personnel to conduct an orderly mount-out. Within each unit, periodic formal embarkation training briefings must be held to indoctrinate fully all personnel with specific responsibilities in the embarkation field. These training briefings assist those key petty officers who must transform the planning into reality. All officers and key company and department personnel must have a working knowledge of the embarkation sequence to prepare their respective company/department adequately for mount-out. All formal training must be conducted according to COMSECOND/COMTHIRDNCBINST 1500.20.

Loading Teams

Loading aboard a ship or aircraft presents problems in the loading of vehicles. This is especially true of heavy construction equipment. To provide rapid embarkation and to prevent vehicle damage, you must give personnel prior training in the loading of these complex pieces of equipment. Embarkation exercises must be carefully designed to provide training and practical experience to drivers, equipment operators, and loading personnel. These exercises must be conducted at frequent intervals so an adequate number of capable and experienced loading personnel are available at all times.

EXERCISE FLYAWAYS AND SHIPLOADING

COMSECOND and COMTHIRD NCB will schedule, as a minimum, one amphibious/MSC/air exercise per deployment. All exercise simulations within the exercise scenario must be approved by COMSECOND/COMTHIRD NCB. The scope and specific directions for the exercise will be specified in the EXERCISE-OPORD issued by COMSECOND or COMTHIRD NCB. Additional exercises maybe called when the battalion is assigned one of the contingency designations of the Atlantic or Pacific Fleet's NCF. This exercise is designed to determine the unit's capability to fulfill mission requirements.

The appropriate home-ported NCR will schedule, as a minimum, one mobilization exercise during each battalion's home port period. This exercise will test the ability of the battalions to mount-out from home port. One or all of the exercise types, air detachment, air echelon, and sea echelon, will be scheduled.

Static Load Exercises

Static load exercises are provided to familiarize NCF personnel with the different types of AMC aircraft. These exercises should be used with the AMC affiliation planning/loading courses. Personnel and equipment are provided by the requested organization.

Emergency Deployment Readiness Exercises

The intent of this training is to exercise both the Air Force and the NCF personnel in their joint capability to load, move, and unload troops and cargo in a no-notice emergency environment.

EMBARKATION EXECUTION

Embarkation planning and preparation of personnel, supplies, and equipment to conduct an amphibious operation or air movement are expensive in terms of time and manpower. **Remember, embarkation efficiency is usually directly proportional to the time and effort spent in developing and preparing the plan.** A well-developed plan usually reduces the time and effort required for embarkation. Well-developed plans help ensure that the embarkation is orderly, efficient, and effective. Staff officers responsible for embarkation must be sure that embarkation is executed on schedule according to the timetable that has been established by their command or by higher authority.

MOUNT-OUT CONTROL CENTER (MOCC)

Upon receipt of an initiating order from higher authority to mount-out and deploy, the executive officer or second in command, such as the AOIC, must implement the MOCC. The MOCC controls, coordinates, and monitors the movement of all personnel, supplies, and equipment to the embarkation staging area. The MOCC usually has authority to establish traffic control, issue movement orders to units concerned, and control transportation used in the embarkation mount-out. The MOCC also coordinates and schedules the movement of personnel, supplies, and all related equipment from the storage areas, warehouses, or unit's base camp area to the staging area for embarkation. Within an NCF unit, the MOCC, with the embarkation staff, has the function of controlling all aspects of an NCF mount-out. The MOCC serves as the coordinating center for all of the companies and all of the staff section heads.

The ability to evaluate, process, and disseminate information is of utmost importance to the functioning

of the MOCC. Sufficient communication equipment must be located in the MOCC to ensure the continuing flow of information to and from the MOCC. External and internal communications to and from the MOCC are essential to a successful embarkation evolution.

The actual loading of vessels or aircraft is the responsibility of the embarkation officer of the deploying unit, and the combat cargo officer of a ship, or the departure airfield control group (DACG). Actual aircraft loading is made with the U.S. Air Force ALCE for aircraft. The MOCC must be kept informed as to the progress of loading by the embarkation staff. This enables the MOCC to file the required reports with higher authorities.

A preplanned checklist that indicates the responsibilities of each staff member in the NCF unit forms the basis for reporting to the MOCC and for display of status information. See figure 4-7, which shows a mount-out checklist for the company commanders. Figure 4-8 shows a mount-out for the project officer or chief. Each staff member in a department of an embarkation unit should have a copy of the checklist. Each item on this checklist should be reported when it is due, along with any other information that could have an impact on the organization. Any information you are uncertain about regarding its value to the MOCC should be resolved in favor of reporting. It is impossible to have an MOCC that is too well informed.

AIR EMBARKATION

An airlift can be affected adversely by weather, enemy air superiority, and airfield limitations (some airfields are not able to handle every type of cargo aircraft). Still, movement by airlift offers commanders distinct advantages, and the demand far exceeds current capabilities. An airlift is essential when the rapid response to a threat halfway around the world may govern the outcome of a confrontation. The aircraft load planner must be familiar with each type of aircraft that may be used during inter-theater and intra-theater operations. The planner must anticipate changes in the allowable cabin load, types of aircraft, and unit destinations (facilities available). Other consideration include CESE air certification on one type of aircraft and not another, hazardous cargo limitations (as stated in AFR 71-4/NAVSUP 505, *Packaging of Materials*, volumes 1 and 2), and other variables. An airlift provides the means for commanders to achieve mission success. The mobility an airlift provides affects the strategy of tactical forces, and permits those forces to move quickly into the battle area. With an airlift, forces can easily and rapidly cross such barriers as water, mountains, or jungles.

The movement of personnel, supplies, and equipment by fixed-wing aircraft or helicopter involves the same planning and embarkation procedures as for amphibious loadouts. However, the requirement for a detailed load plan is considered even more essential in air movements. A loading diagram is required aboard each aircraft. This diagram lists all equipment and supplies to be carried and specifies where the supplies are located in the fuselage station.

Movement Planning

Rapid and orderly deployment of units by air requires careful and detailed preplanning. Air movement plans must be flexible so they can be readily adapted to last minute changes. The number and type of available aircraft are subject to change. The payload for any transport aircraft can vary widely depending on distance, head winds, and various other factors. Changes in the weather may require adjustments in aircraft loads just minutes before takeoff. Remember, planning for an air movement must be continuous. You can make the following assumptions when planning for an air embarkation movement:

1. The airlift maybe strategic or tactical depending on the situation.

2. Peacetime preliminary load plans for an allowable cabin load (ACL) are 25,000 pounds for a C-130, 50,000 pounds for a C-141B, and 150,000 pounds for a C-5B.

3. Combat situations may drastically increase the size of these loads.

Aircraft Capabilities

Under normal operations, the NCF uses three types of aircraft for embarkation. Each aircraft type has specific capabilities and limitations. These include takeoff or landing requirements on tactical runways, packed dirt, or on a short airfield for tactical support (SATS) type of landing facility. Presently the C-130, which is considered a tactical aircraft, is used for this kind of operation. The C-141 and C-5 aircraft normally require a full-service air facility, and they are considered strategic aircraft. Tables 4-2 and 4-3 show the load dimensions and limitations of each of these aircraft. This information should be very useful in the planning of aircraft loads.

COMPANY COMMANDERS	SCHEDULED COMPLETION DATE		INITIAL
	TA 41	TA 31/22	
1. Hold interim inspection of personnel for: a. ID cards b. ID tags c. Wills and power of attorney d. Personal gear to be shipped after mount-out for adherence to custom regulations	H + 5	H + 15	(9)–(36)
2. Hold initial check of personnel for: a. Complete seabag issue b. 45-day supply of toilet articles c. 782 gear and weapons	H + 5	H + 15	(9)–(36)
3. Submit rough personnel manifest to S-1/Personnel Officer.	H + 13	H + 39	(36)–(81)
4. Require all battalion owned library books and special service gear to be turned in.	H + 17	H + 51	(81)–(84)
5. Prepare company gear for storage and/or embarkation.	H + 24	H + 72	(84)–(101)
6. Have men mark seabags, packs, weapons, and other baggage with tags.	H + 31	H + 93	(122)–(135)
7. Brief company on: a. Security of information b. Mail or censorship requirements c. Baggage allowance and packing requirements d. Disposition of personal fire arms, vehicles, etc. e. Code of conduct	H + 36	H + 108	(135)–(146)
8. Provide working and security parties as requested by Operations Officer.	H + 5	H + 15	(9)–(36)
9. Designate personnel to fill required billets aboard ship while in transit. Give list to Personnel Officer.		H + 90	(101)–(122)
10 Conduct personnel, 782 gear and weapons inspection.	H + 36	H + 108	(135)–(146)
11. Inspect company spaces for cleanliness prior to embarkation, secure company office spaces.	H + 44	H + 132	(146)–(160)
12. Have company stand by for briefing.		H + 138	(160)–(164)
13. Draw served weapons.			
14. Supervise moving personnel to embarkation site for departure.	H + 46	H + 138	(160)–(164)

Figure 4-7.—Mount-out checklist for the company commander.

PROJECT OFFICERS		SCHEDULED COMPLETION DATE	INITIAL
	TA 41 TA 31/22		
1. Assist S-3/Operations Officer in classifying projects to be closed out.	H + 5	H + 15	(10)—(37)
a. Class 1 Projects: A regular project which requires little or no equipment or vehicle support in immediate area.			
b. Class 2 Projects: Those projects which depend mainly on heavy equipment or vehicle support for successful completion.			
c. Class 3 Projects: Details not deployed in camp or immediate area. Establish immediate communication with Class 3 project officer to begin setting up securing of details. Arrange for air transportation to return men and equipment as soon as possible.			
2. Initiate close out.	H + 6	H + 18	(37)—(57)
3. Begin close out of Class 2 and 3 Projects.	H + 18	H + 54	(57)—(86)
4. Advise operations of any waste or damage likely to result from unfinished construction, non-grading or poor storage.	H + 30	H + 90	(86)—(123)
5. Close out Class 1 Projects.	H + 30	H + 90	(86)—(123)
6. Secure all projects, project shops and battalion shops not required by delayed party or rear echelon.	H + 34	H + 102	(123)—(139)
7. Schedule and conduct field day.	H + 34	H + 102	(123)—(139)

Figure 4-8.—Mount-out checklist for the project officer or chief.

Table 4-2.–Aircraft Cargo Compartment Dimensions and Limitations

CAPABILITIES DIMENSIONS AND LIMITATIONS CARGO COMPARTMENT			
Popular Name	Hercules	Starlifter	Galaxy
Model Designation	C-130E/H	C-141A	C-5A
Length (inches)	492	840	1454
Width	123	123	228
Height	108	109	162
Troop Door Height/Width	Height 72 Width 36	Height 72 Weight 36	Height 72 Width 36
Allowable Cabin Load	35,000	50,000	100,000 (Restricted)
Loading Ramp Length Loading Ramp Width	120 123	133.25 123	Fwd 122 Aft 155 228 228
Max Takeoff Gr. Wt.	155,000	323,100	712,500
Max Landing Gr. Wt.	154,000	257,500	635,850
CB Forward Limit	512	910	1200
CB Aft Limit	536	945	1300
Optimum CB Location	524	925	1244
Restraint Factor in "G" Forward	3	3	3
Restraint Factor in "G" Aft	1.5	1.5	1.5
Restraint Factor in "G" Vertical	2	2	2
Restraint Factor in "G" Lateral	1.5	1.5	1.5
Passenger Load (Max)	Side Seats 90 42	Side Seats 152 70	Cargo Floor 270 EWP Upper Deck 73 (20 Now)
Floor Height	50	50	Forward Aft 36 to 70 73 to 105
Nr. of Pallets (463L)	6	10	36
Cargo Floor Limits Treadway Axle Loads	E-F-G-H-I-J 13,000 C-D-K 6,000	D-E-F + L-M-O 10,000 G-H-I-J-K 20,000	N/A
Between Treadway Axle Loads	C thru J 5,000 Tongue Load 2,000	D↔F G↔K L↔O 5000 4400 3700	N/A
Treadway PSI	50	50	N/A
Between Treadway PSI	50	25	N/A

Table 4-3.—Aircraft Cargo Compartment Load Limitations with Pallet Position Center of Balance

	C-130E/H	C-141A	C-5A
Treadway Cargo Floor Length & Width	Length 492 Width 35 Each	Length 810 Width 34 Each	Fwd/Aft Ramp Limitations
Ramp Limitations			
Treadway Axle Loads	L-M Single Axle 2500 Item 3500	7500 With Shoring Gr. Wt. Ramp 7500	Total maximum allowable load, including cargo, pallets, nets and any other equip. on ramps shall be limited to a maximum of 15000 lbs for each ramp.
Between Treadway Axle Loads	L-M Tongue Load 1200 450	Max. Axle 5000 Max. Wheel 2500	
Treadway PSI	50	On Treadway 50 Between Treadway 25	Maximum allowable load 3600 in any 20-inch length of the ramp (Fwd & Aft) or 2 7500 lb pallets.
Ramp Treadway Length & Width	Length 132 Width 35	Length 131.25 Width 34	Cargo Floor Limitations
Ramp Maximum Vehicle Height	80	80	Maximum allowable load 36000 lbs in any 40-inch length of cargo floor from Fus. Sta. 724 to 1884.
Ramp Maximum Pallet Height	76 (Pallet Pos.#6)	76(Pallet Pos.#10)	
Ramp Maximum Pallet Weight	4700 (Plt. Pos. #6)	2500 Out of Pos. 7500 In Pallet Pos.	Maximum allowable load 20000 lbs in any 40-inch length of cargo floor from Fus. Sta. 517 to 724 and 1884 to 1971.
Cargo Floor Vehicle & Pallet Limitations			
Cargo Floor Maximum Vehicle Height	105 245-737	80 492-538 108 539-1292	Maximum bogey axles are 25000 lbs each.
Cargo Floor Maximum Pallet Height	100 (Pos. 1 thru 5)	76 (Pallet Pos. #1) 100 (Pos. 2-9)	Maximum single axles are 36000 lbs each.
Cargo Floor Maximum Pallet Weight	10375 (Pos. 1-4) 8500 (Pos. #5)	10354 (Pos. 1-9)	Side by side or multiple wheeled vehicle axles loaded between F.S. 1458 and F.S. 1518 are limited to a combined maximum weight of 25000 lbs. Tracked vehicles are excluded from this restriction.
			Maximum pallet weight cargo floor 10354 lbs each. Ramp pallets max. wt. 7500 lbs each. Aft ramp pallet height (back side) 75 inches.

AIRCRAFT PALLET POSITIONS CB

C-130E/H		C-141-A		C-5A	
PP	Fuselage Station	PP	Fuselage Station	PP	Fuselage Station
1	332	1	531	1&2	443
2	422	2	621	3&4	566
3	512	3	711	5&6	656
4	602	4	801	7&8	746
5	692	5	891	9&10	836
6	803	6	981	11&12	926
		7	1071	13&14	1016
		8	1161	15&16	1106
		9	1251	17&18	1196
		10	1352	19&20	1286
				21&22	1376
				23&24	1466
				25&26	1556
				27&28	1646
				29&30	1736
				31&32	1826
				33&34	1916
				35&36	2065

Note: Add or subtract 44 inches to these figures to find where a pallet starts or stops.

Example; C-141 pallet position #5 would start at 937 and end at 1025.

Airlift Requests

Units designated as mobile and tasked with developing contingency plans (such as NMCBs) should continually maintain a list of air transportable equipment and the type of aircraft on which the equipment can be carried. This is necessary because the NCF and other types of mobile units are constantly receiving new and updated equipment.

The U.S. Air Force Airlift Mobility Command (AMC) is the primary transport service of the DoD. AMC provides scheduled and special airlifts of armed forces personnel for the following categories:

– Airlift support of basic or continuation aircrew training. This category may include static load training (unilateral training).

– Airlift purchased or contracted by a user for its own unilateral support. This is designated as a special assignment airlift mission (SAAM). This category includes commercial charter aircraft used to deploy a unit to an overseas site.

– Joint Chiefs of Staff (JCS) approved airlifts used in support of joint exercises. These are designated as JCS exercise airlifts. This category maybe required for multiservice/multinational exercises.

– Out-of-CONUS or theater service airlifts over established routes. These flights are designated as AMC channel flights and are normally managed similar to scheduled flights. This category also may be contracted to a commercial carrier to fly specific high-use routes.

– Joint Airborne/Air Transportability Training (JA/ATT) airlifts. These are part of an AMC-sponsored program that provides AMC aircrews and support units with training in the various AMC aircraft, equipment, and procedures. This category provides specific training data in the loading and transporting of all military equipment and particularly NCF-unique CESE.

Airlift requests must be prepared according to OPNAVINST 4630.18. It is important to remember that only equipment that is certified to be air transportable by the U.S. Air Force can be moved by AMC aircraft.

Unit Responsibilities

The unit requesting airlift support from AMC headquarters is required to provide specific personnel in support of the airlift. Support personnel are designated as follows:

Departure Airfield Control Group (DACG). The DACG is responsible for controlling all items to be airlifted. The DACG ensures that the flow of personnel, material, and equipment is smooth and efficient when called from the alert holding area to the call forward area. The DACG also is responsible for providing security, food service, and rest areas, if required.

Arrival Airfield Control Group (AACG). The AACG is responsible for the receipt of all airlifted items to the AMC-contracted airfield. The AACG also is responsible for ensuring orderly and timely movement of personnel, material, and equipment from the airfield to the deployment site. If troops remain at the arrival airfield area because of transportation or other unforeseen delays, the AACG team is responsible for providing food service, and rest areas, if required, at the arrival area.

The staging and marshalling area is where equipment and material are received and placed into a corfiguration (chalk) for each aircraft. All vehicles are checked for cleanliness and minor leaks are repaired. It is here that mobile loads are completed, vehicles are weighed and marked for center of balance, and cargo is palletized on approved Air Force 463L cargo pallets, which are also weighed and balanced. The staging and marshalling area is not necessarily in the vicinity of the departing airfield. It is usually in close proximity to the CESE equipment preparation area and the main supply area, where palletizing and mobile loading is done.

The alert holding area is where vehicles and passengers are held in the vicinity of the departing airfield. At this time control is passed to the DACG, and chalks are inspected to ensure everything manifested is actually present. When all manifested items have been confirmed, the DACG supervisor and representatives of the U.S. Air Force ALCE will direct the movement of assigned chalks to the call forward area. The call forward area is where the joint inspection of chalks by the ALCE team and the NCF representative takes place. After the complete chalk is inspected, it is moved to the ramp loading area when called for by the ALCE team.

Flight OIC

A flight manifest must be prepared for each aircraft. It must include the name of the unit to be airlifted, the OIC, and the type of aircraft. The manifest should also have the number of the aircraft tail, mission, and passengers. It should have the total weight of any passengers, hand-carried and hold baggage, a description of cargo, weight and cube of cargo, and the total weight.

The senior individual in each aircraft load of troops is designated as the OIC and is provided a copy of the passenger manifest. Each OIC must be thoroughly briefed on his or her responsibilities. This example of an information sheet outlining OIC duties and responsibilities should be of value to you.

A. Duties of a flight OIC

You have been selected as the OIC for this planeload of passengers. Such action is necessary for proper control and coordination of troop loads with the limited passenger and processing personnel available. Your timely execution of assigned duties will reduce confusion and greatly assist in the prompt dispatching of the aircraft.

Step 1. Familiarize yourself with the properties of dangerous cargo aboard the aircraft and be prepared to assist the flight crew in any cargo-related emergency, if requested.

Step 2. When the aircraft lands en route to or from home base, make arrangements for proper cargo security. Use your assistant as a guard, or make other necessary arrangements to ensure the cargo is protected.

Step 3. Familiarize yourself with the priority of the cargo aboard. In the event it becomes necessary to off-load cargo en route, advise the aircraft commander or AMC transportation representative of what cargo should be off-loaded.

Step 4. If any portion of cargo is off-loaded at a base en route, one custodian must remain with the off-loaded cargo, and one custodian must remain with the aircraft (or as directed by the unit mobility officer). Off-loaded cargo should be reported by naval message, finishing all pertinent information to the appropriate commander at the base where the cargo was loaded and to the commander at the forward operating base.

Step 5. Upon arrival at the forward operating base or at the home station, the senior cargo custodian should report to his or her unit and deliver the cargo manifest to the unit's property custodian.

B. Responsibilities of a flight OIC

You will need to ensure the following:

Ž All baggage and personnel are weighed.

Ž Transportation is arranged for movement to the airfield.

Ž Each piece of baggage returning to CONUS has been inspected, customs regulations followed, and DD Form 1854 (Customs Declaration) completed.

Ž Flight rations are supplied.

Ž Personnel have up-to-date immunization and identification cards.

Obtain from the administration officer (S-1) all information, such as medical certificates of absence of communicable disease, group travel orders, cargo manifests, and customs declarations if returning to CONUS.

The flight OIC should muster his or her personnel and maintain them in a 1/2-hour ready status from 24 hours before the scheduled flight time until the flight departs. The OIC must be sure that personnel and baggage arrive at the air terminal 3 hours before the scheduled arrival of the aircraft or as directed.

Before departing the camp area, the OIC should do the following:

1. Muster all personnel to confirm the flight manifest.
2. Collect a copy of DD Form 1854 from each person returning to CONUS.
3. Have all personnel complete next-of-kin cards for submission at the air terminal before embarkation.
4. Hold a personnel inspection to ensure that everyone is in proper uniform.

At the departure airfield, the OIC and the embarkation officer should coordinate embarkation with the DACG. This is necessary to make certain that all personnel, baggage, cargo, bagged 782 gear, boxed weapons, and ammunition are loaded aboard the aircraft. During the transit, the flight OIC should perform on a routine basis the following duties:

1. Maintain a rough log of significant events, beginning with the first muster.
2. Exercise military control over personnel in the flight.
3. See that personnel are kept informed of all pertinent matters.

4. Detail working parties for loading and unloading of cargo and gear.
5. Ensure that 782 gear, weapons, and ammunition accompany the flight after all intermediate stops.
6. See that flight personnel are provided meals. If meals are not available during the flight, have the aircraft commander radio ahead to request box lunches or hot meals available at each refueling point.
7. In the case of a delay, the OIC should arrange for berthing when necessary and provide guards for weapons, baggage, and cargo.
8. In the event the aircraft commander orders the removal of personnel, the OIC must ensure their personal baggage and leave forms (DD Form 1854) accompany them. The OIC must also see to it that their orders are properly modified so they may proceed via another AMC flight. If an AMC flight is unavailable, those orders should be modified so the y can proceed via commercial transportation. The allocation of aircraft to Seabee units is done by AMC after the requirements for airlift have been received. When airlifted by AMC, the movement schedule is prepared by the air transport command designated to control the aircraft.

Hazardous Cargo

Hazardous cargo must be packaged and handled according to AFR 71-4/TM 38-240/NAVSUP 505/MCO P4030.19 series. Cargo that is considered hazardous must be handled according to these manuals! **There are no exceptions!**

Hazardous cargo must be certified on a special handling data/certification form (fig. 4-9) before it can be accepted for movement by airlift. As the user, it is the responsibility of the deploying unit to provide qualified personnel to certify hazardous cargo. It also is the deploying unit's responsibility to be sure that the information on the special handling data/certification form is complete and correct.

Vehicle/CESE Preparation

ALFA company is responsible for all CESE preparation. All vehicles and equipment must be absolutely clean before being loaded aboard an aircraft. Mud, oil, grease, or any other foreign matter must be removed, and all leaks must be repaired before assignment to a chalk. The flow of the CESE through ALFA company is similar to the Battalion Equipment Evaluation Program (BEEP). Embarking on an aircraft requires special loading procedures for several types of CESE assigned to the battalion TOA. These procedures are outlined in the *Naval Construction Force Embarkation Manual,* COMSECOND/COMTHIRD-NCBINST 3120.1 series. ALFA company is responsible for following the procedures, including the removal of dump truck headache racks, equipment exhaust stacks, dozer blades, counterweights, and equipment roll-over protective structures (ROPS).

Vehicle fuel tanks must be at least one-fourth full and not more than three-fourths full. If the vehicle is to be placed on the ramp of an aircraft, fuel tanks should never be more than one-half full.

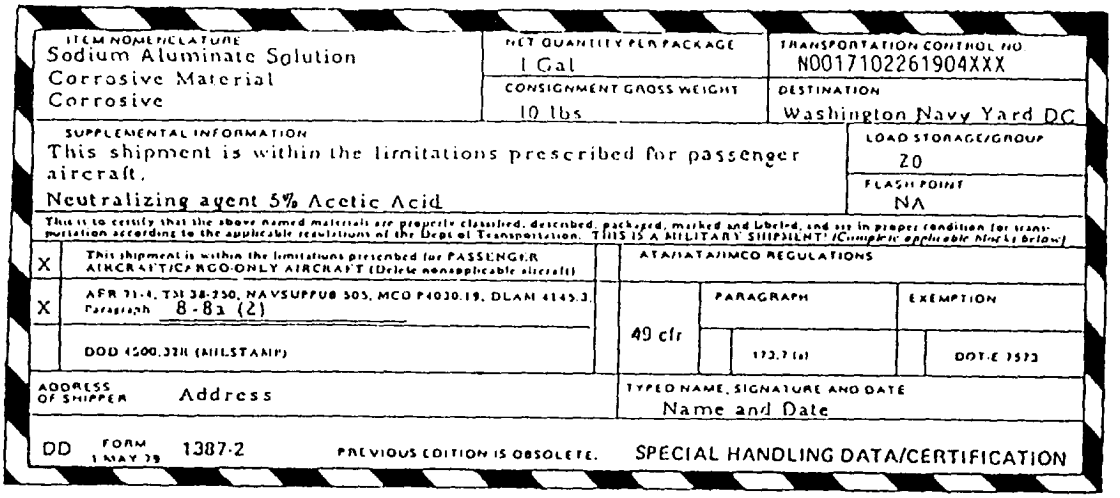


Figure 4-9.—Hazardous Cargo Certification, DD Form 1387-2.

When required for immediate use at deployment sites, engines and other equipment with fuel tanks may be airlifted uncrated and with fuel tanks three-fourths full.

Fuel-in-tank limitations from trailer-mounted and single-axle units must not exceed one-fourth full when these units are disconnected from the prime mover with the tongue resting on the aircraft floor. Additionally, the fuel tank must be drained, but not purged, when these units are positioned on the aircraft cargo ramp.

Tankers and refuelers containing fuel are not authorized for air movement. They must be emptied, purged, and labeled according to NAVSUP 505. Water tanks and water trailers must be airlifted empty according to AFM 76-6, paragraph J-5.

After the CESE has passed the equipment inspection, it is then turned over to the weight and balance team.

Weight and Balance

To plan an airlift and correctly break down loads for individual aircraft, it is necessary to determine the weights and centers of balance (C/B) of the cargo units. There are two main categories of cargo: vehicles and general cargo.

VEHICLES.— The weights and centers of balance of vehicles are determined with secondary loads (mobile loads) mounted. Mobile loads are items of baggage or cargo transported in truck beds and trailers that must be included in the total weight of a vehicle. To determine the C/B on a vehicle, the 20th Naval Construction Regiment Embarkation Staff (R23), Gulfport, Mississippi, recommends the following procedures:

Step 1. Establish the reference datum line (RDL). The RDL is the farthest forward point of a vehicle.

Step 2. Measure distance 1 (D1). D1 is the measurement in inches from the RDL to the center line of the front axle.

Step 3. Measure distance 2 (D2). D2 is the measurement in inches from the RDL to the center line of the intermediate axle or rear axle.

NOTE: The D2 measurement location for vehicles with tandem axles is measured from the RDL to the trunnion.

Step 4. Measure distance 3 (D3). D3 is the measurement in inches from the RDL to the center line of the rear axle. This step is performed on vehicles that have three or more axles or on towed vehicles that will remain married (attached) to a vehicle when loaded on the aircraft. The axles on a towed vehicle will become D4, D5, and so forth (fig. 4- 10).

To perform steps 5, 6, and 7, drive the vehicle onto portable scales placed under the tires on each axle.

Step 5. Determine the forward axle weight (FAW). The FAW is the total weight reading of the scales under each front tire. (Example: The left front tire scale reads 3,000 pounds, and the right front tire scale reads 3,000 pounds. In this example, the FAW would be written as FAW 6,000 pounds.) Write the FAW on a piece of weather-resistant material, such as duct tape, with a grease pencil, and attach to the vehicle fender above the axle. Upon arrival at the site, remember to remove this tape to avoid peeling any paint from the vehicle.

Step 6. Determine the intermediate axle weight (IAW). The IAW is the total weight reading of the scales under the intermediate tires. Follow the procedures for step 5 and label the reading as IAW on the masking tape. Remember, the IAW is the weight readings of both the left and right tire scales added together and recorded in pounds.

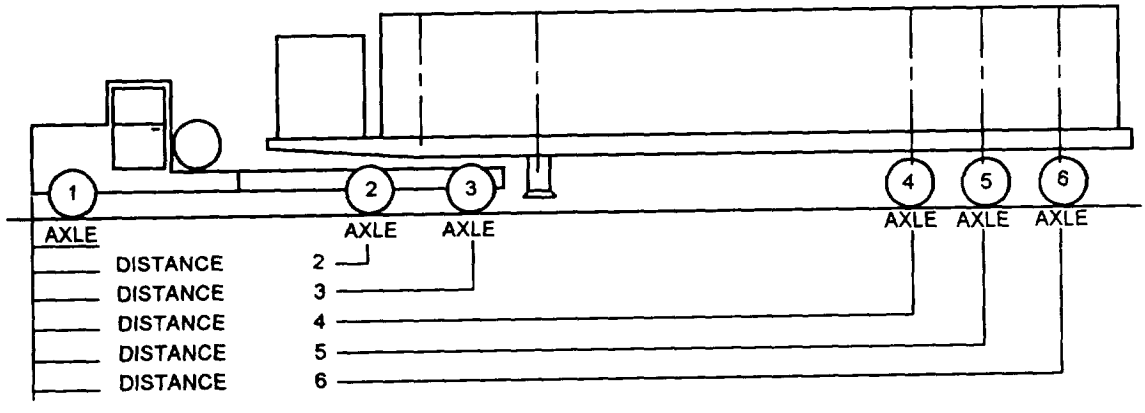


Figure 4-10.—CESE distance measurement locations.

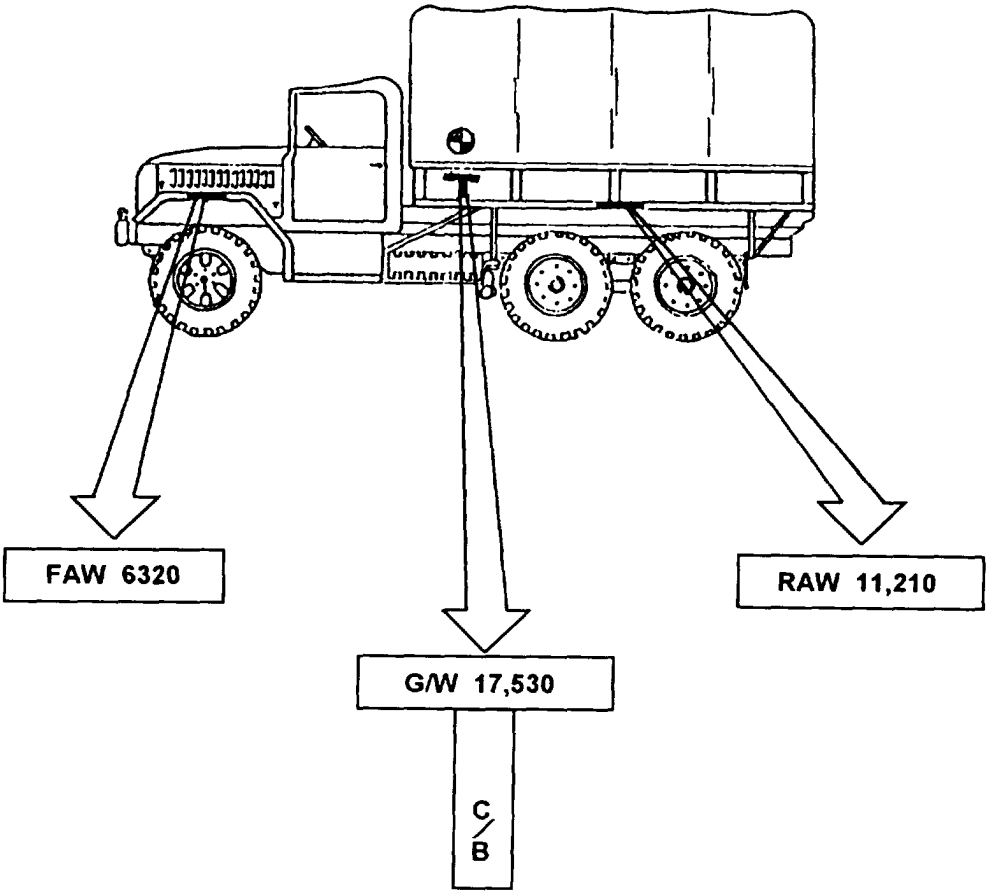


Figure 4-11.—Marking procedures.

Step 7. Determine the rear axle weight (RAW). The RAW is the total weight reading of the scales under the rear tires. Follow the procedures for step 5 and label the reading as RAW on the masking tape. Remember, the RAW is the weight readings of both tire scales added together and recorded in pounds.

NOTE: The RAW for vehicles with tandem axles is the weight of the IAW and the RAW added together and labeled above the trunnion (fig. 4-11).

Step 8. Compute moment 1 (M1). The formula for M1 is distance 1 times the forward axle weight, or D1 x FAW = M1.

Step 9. Compute moment 2 (M2). The formula for M2 is distance 2 times the intermediate axle weight, or D2 x IAW = M2.

Step 10. Compute moment 3 (M3). The formula for M3 is distance 3 times the rear axle weight, or D3 x RAW = M3.

Step 11. Compute the gross vehicle weight (GVW). GVW is determined by adding the axle weights. The formula for GVW is FAW + IAW + RAW = GVW.

Step 12. Determine the total moment (TM). TM is determined by adding all the moments. The formula is M1 + M2 + M3 = TM.

Step 13. Compute the C/B of the vehicle. This is done by dividing the GVW into the total moment, which

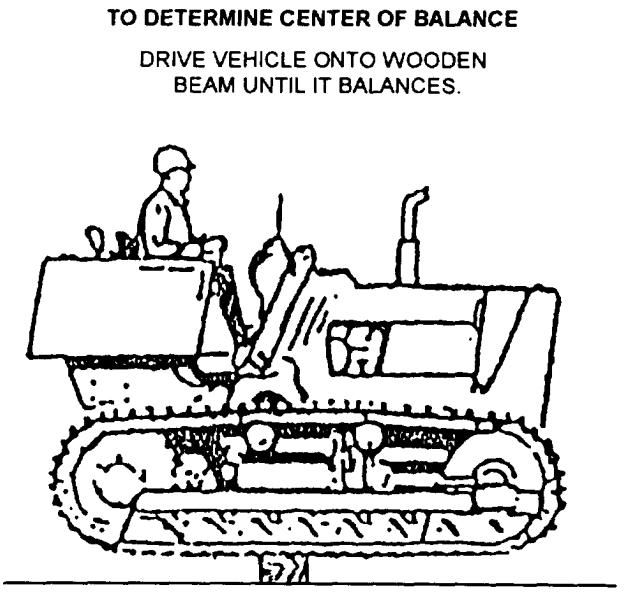


Figure 4-12.—Center of balance of tracked vehicle.

provides the C/B value in inches. This formula is TM/GVW = C/B.

Step 14. Locate the C/B. You locate the C/B by measuring from the RDL the number of inches computed in step 13. At that point, create a letter *T* on the side of the vehicle with masking tape. The horizontal portion of the tape is labeled GW plus the weight. The vertical portion of the tape is labeled C/B and is the distance in inches measured from the RDL (fig. 4-11).

To find the C/B of a track vehicle (dozer), drive the vehicle onto a wooden beam until it balances (fig.4-12). The weight of a track vehicle is determined by laying wood on top of the scales and driving the dozer onto the wood. The sum of the weight of the scales provides the GVW.

Once all the weights have been computed, they are marked on both sides of the vehicle and are annotated on the manifest list. The vehicle is then staged on the scheduled chalk.

Although there are other procedures used to compute the C/B for vehicles, the previously listed procedures must be followed when you use the CALM computer program currently used in the NCF.

PALLETIZED CARGO.— Cargo should be palletized on 463-L air certified pallets, as shown in figure 4-13.

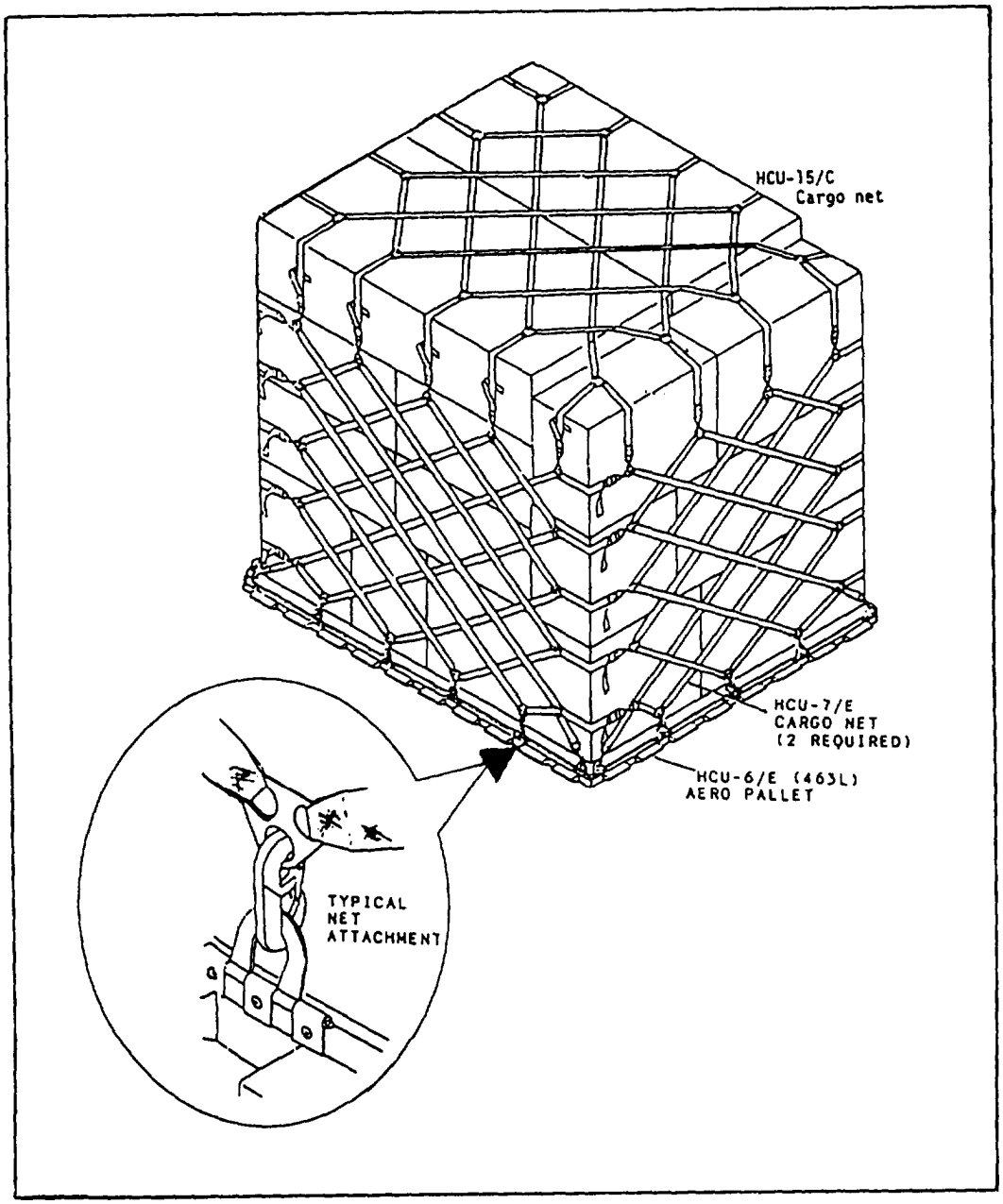


Figure 4-13.—463-L pallet with cargo and nets.

Pallets and pallet nets are procured from the Air Force. The 463-L pallet is the standard system for the movement of concentrated cargo used by the Air Force. Military airlift aircraft are equipped with a dual-rail system consisting of rows of rollers, which allow 463-L pallets to move easily into and out of the aircraft. The 463-L pallet is made of corrosion-resistant aluminum and has a soft wood core. The pallet has an outside dimension of 108 inches by 88 inches and is 2 1/4 inches thick. The cargo area space is 104 inches by 84 inches, which is enough space to allow 2 inches around the 463-L pallets to attach straps, nets, or other restraint devices. A 463-L pallet weighs 290 pounds empty and has a maximum load capacity of 10,000 pounds. However, to prolong pallet life do not exceed a pallet load of 7,500 pounds.

Pallet nets can provide adequate restraint for 10,000 pounds of cargo when properly attached to the 463-L pallet. A net set contains two side nets and one top net. The side nets are green, and the top net is yellow. The side nets attach to the pallet rings, and the top nets attach by hooks to the side nets. These nets have multiple adjustment points and may be tightened to fit snugly on most any load. A complete set of 463-L nets (three nets) weighs 65 pounds. Other cargo restraints are chains and chain tiedown devices. These are used for large items, such as Conex boxes, Seabee shelters, and reefer units. Five thousand-pound tiedown straps (fig. 4-14) are used to secure equipment attachments and provide individual item restraints. Additionally, the tiedown straps provide supplemental restraint to the 463-L pallet nets.

Cargo is palletized from the heaviest to the lightest. Large and heavy objects are distributed evenly from the center of the pallet outward to prevent the pallet from becoming heavy on one end. This distribution also helps to maintain the C/B at or near the center. Lighter or smaller items are positioned on top or along the side of the heavier cargo. Containers marked "THIS SIDE UP" are placed upright, and cargo with special labels are faced outward whenever possible. Pallets should be constructed in a square or pyramid shape whenever possible (fig. 4-15). This makes the load stable, easy to handle, and easier to secure on the pallet.

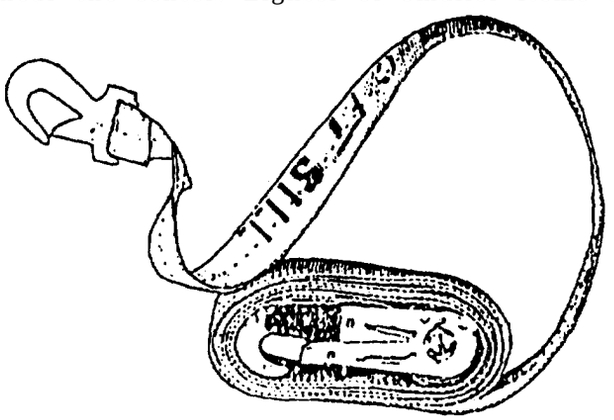


Figure 4-14.—5,000-pound tiedown strap.

Each 463-L pallet requires dunnage under the pallet when not on board the aircraft. The dunnage consists of three pieces of 4-inch by 4-inch by 90-inch timbers. The dunnage is placed in the center and close to the outside edges of the pallet. This prevents the pallets from warping and enhances forklift operations. Each aircraft has restrictions as to the dimensional size and shape particular to that specific aircraft. Aisleways must be built on pallet position three or four in a C-130 aircraft. Check the particular requirements of the aircraft for which you are preparing a load.

The marking of the C/B is not necessary on individual 463-L pallets. When 463-L pallet loads are built correctly, the C/B will be at or near the center. The pallets are weighed by using portable scales. The weight of the dunnage must be weighed with the pallet. The scaled weight of the pallet is recorded on the manifest

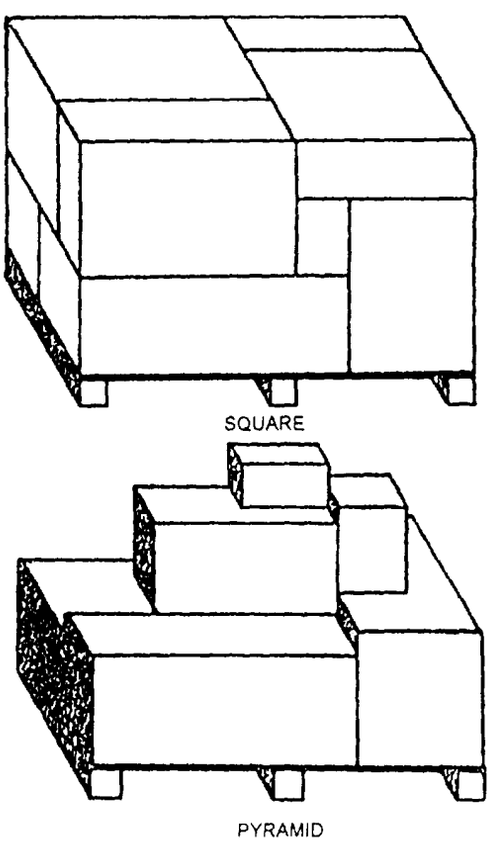


Figure 4-15.—463-L pallet cargo placement.

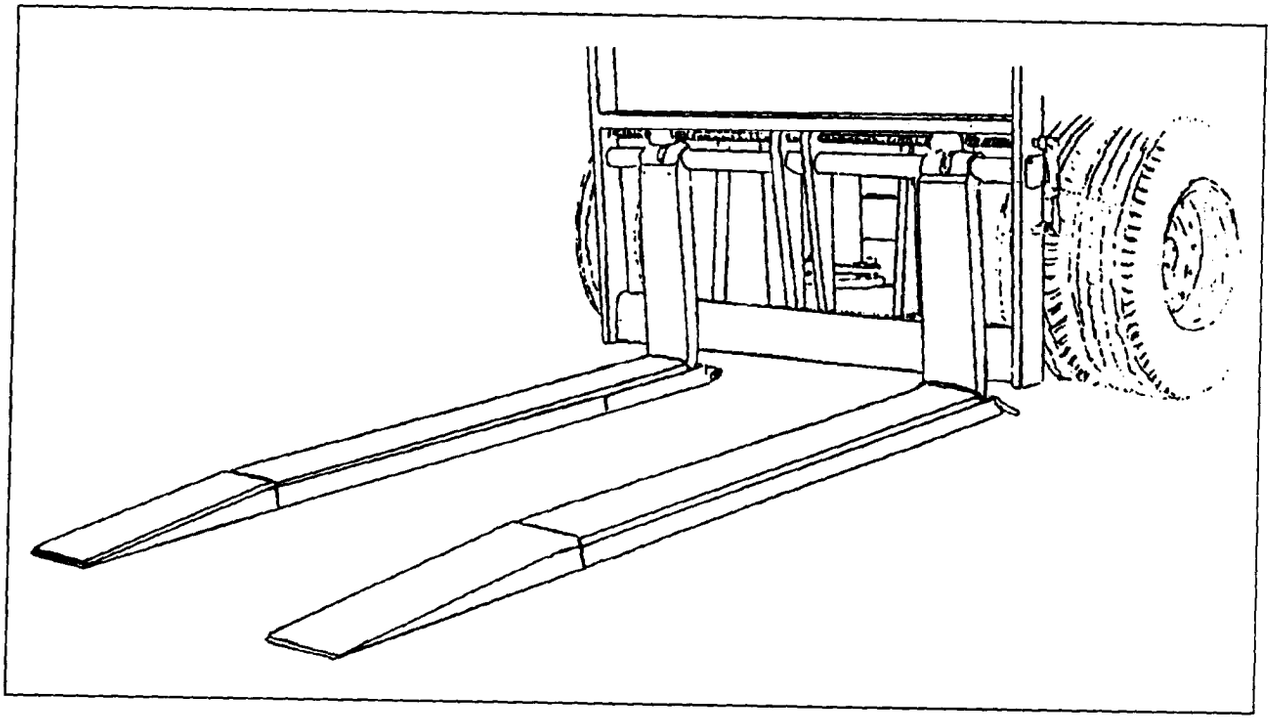


Figure 4-16.—Bare tine extenders.

and labeled on each side (88-inch dimension) of the 463-L pallet.

Handling and loading 463-L pallets with a forklift requires the use of fork extensions (tine fork extenders) to support the weight and size of the pallet fully. Technical publications that govern loading procedures for aircraft require forklift tines be a minimum of 72 inches in length.

The extenders are designed in two configuration: bare tine extenders (fig. 4-16) and rollerized tine extenders (fig. 4-17). The rollerized version of tine extenders is best suited for the rapid handling of 463-L pallets. The bare tine extenders are more useful in pallet building and the placement of mobile loads on beds of vehicles. Either type of extender is acceptable and can be locally manufactured. However, you must exercise

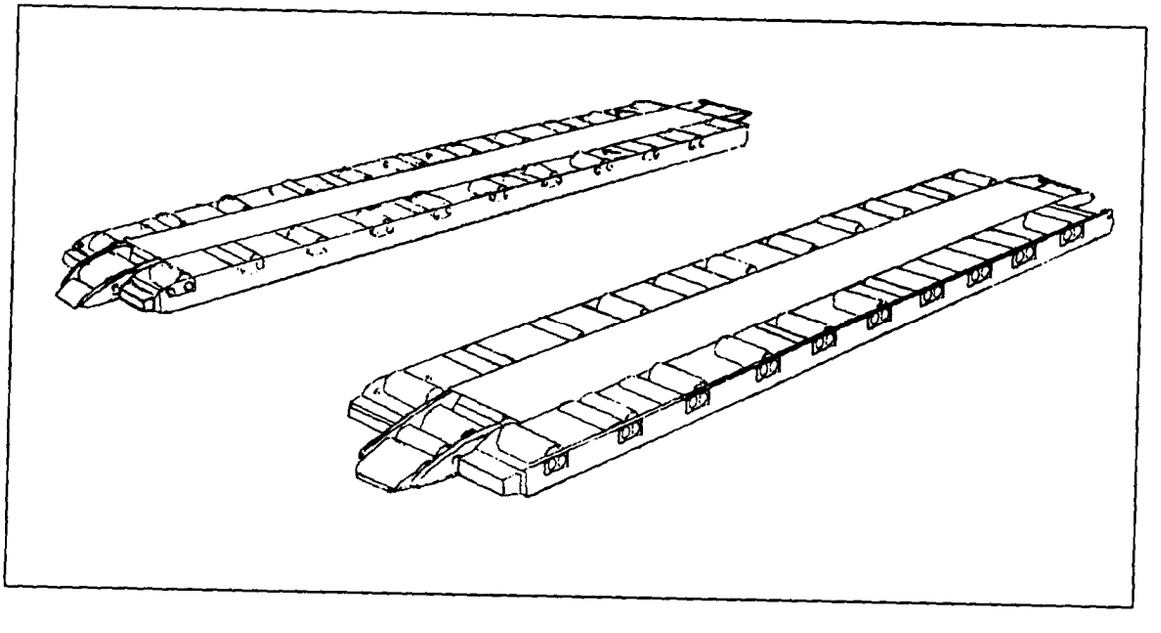


Figure 4-17.—Rollerized tine extenders.

extreme care when handling 463-L pallets, because the tine tips can easily damage a pallet surface and render it unusable. To allow for unloading aircraft and handling pallets at the campsite, you must be sure that a set of tine fork extensions are embarked with the cargo and CESE. The 12K Lift King forklift currently assigned to the NCF TOA has a set of roller tine fork extensions assigned as an attachment.

Once on site, the pallet loads are usually broken down and a supply area is set up for material and tool distribution. Always have control over the location and condition of the pallets, pallet nets, chains, chain tie-down devices, and even the 5,000-pound cargo strap. If you lose control of these items, there is a good chance they will be rendered useless after being run over, walked on, buried, or otherwise damaged or destroyed.

The recommended procedure for storing pallets is to place three sets of 4-inch by 4-inch dunnage down and stack the pallets ten high. Then, place three more sets of 4-inch by 4-inch dunnage and stack ten more pallets. Never stack pallets upside down. This could damage the rings or the aluminum surface. **Never stack pallets over 40 high.** Store all the 4-inch by 4-inch dunnage, chains, chain tie-down devices, and cargo straps in one location. Be sure to protect pallet nets from adverse climatic conditions. The netting materials may mildew and deteriorate, and the metal hooks can rust if not properly cared for. Custody of 463-L pallets, pallet nets, 4-inch by 4-inch dunnage, chains, chain tie-down devices and cargo straps must be maintained throughout the mission. These items are extremely expensive to purchase and refurbish and may be required for future airlift plans.

Flight-line Safety

Although mission accomplishment is of paramount importance, it must be done safely and without injury to personnel or damage to equipment. Both efficiency and safety can be accomplished during an air embarkation operation. The following flight-line rules must be strictly observed:

- Smoking is permitted only in designated areas.
- Sitting or lying on the aircraft parking apron is prohibited.
- Extreme caution must be taken around aircraft engines and exhaust. See figures 4-18 through 4-20.

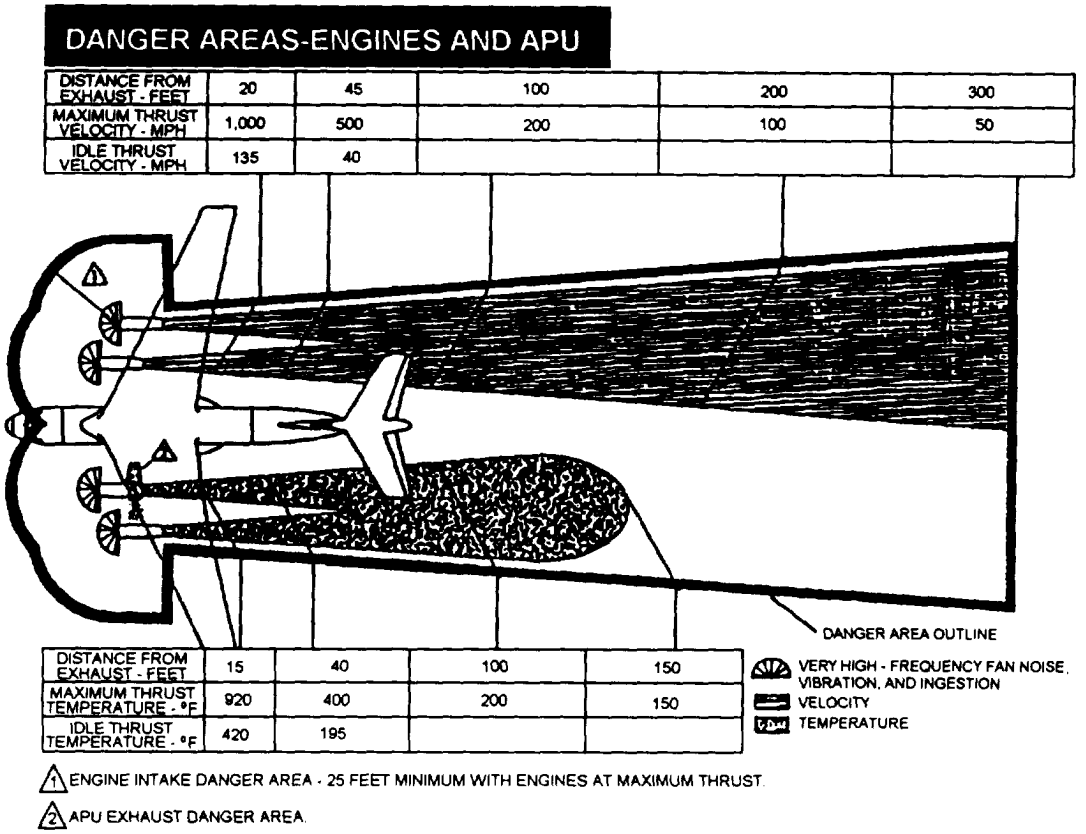


Figure 4-18.—Danger areas—engines and APU.

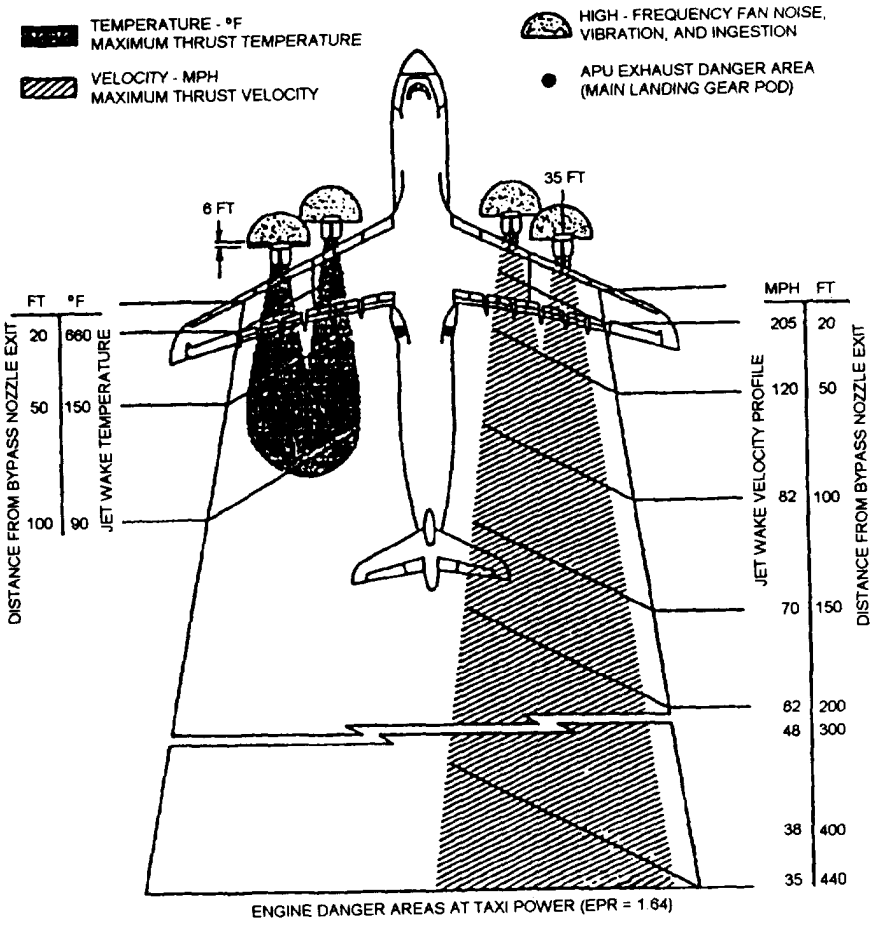


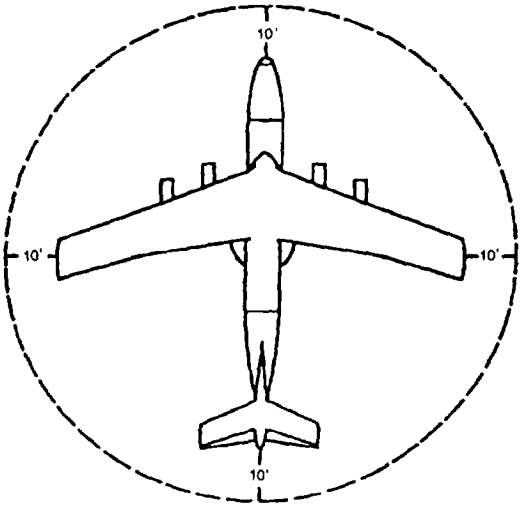
Figure 4-19.—Engine danger areas—at taxi power.

- Do not permit personnel to walk in front of vehicles that are being driven near or are being backed into an aircraft.

REQUIRED EAR PROTECTION	
DECIBELS	REQUIRED EAR PROTECTION
O-85-DB	NO PROTECTION REQUIRED
85-100 DB	EAR MUFFS OR EAR PLUGS REQUIRED
ABOVE 100 DB	EAR MUFFS AND EAR PLUGS REQUIRED
135-145 DB	EAR MUFFS AND EAR PLUGS REQUIRED. LIMITED TIME EXPOSURE
ABOVE 145 DB	PROHIBITED

Figure 4-20.—Required ear protection in vicinity of aircraft.

- Observe the circle of safety rules, as indicated in figure 4-21.
- Do not permit vehicles to park within 25 feet of an aircraft. Park vehicles parallel to the wing axis with the ignition off, transmission in its lowest gear, parking brake set, and wheels chocked (fig. 4-22). Chocks are not required if the driver remains in the vehicle. Between sundown and sunup, lights should be left in the park position.
- Ensure all personnel wait in the marshalling area, unless they are specifically assigned to a job in the aircraft loading zone.
- Do not permit personnel to enter an aircraft cockpit or other restricted areas, unless they are requested to do so by the aircrew.
- Observe all flight-line speed limits. They are aircraft parking ramp = 10 mph, within 25 feet of the aircraft = 5 mph, inside the aircraft= 3 mph. These limits must be followed at all air terminals unless otherwise directed by terminal or flight-line officials.



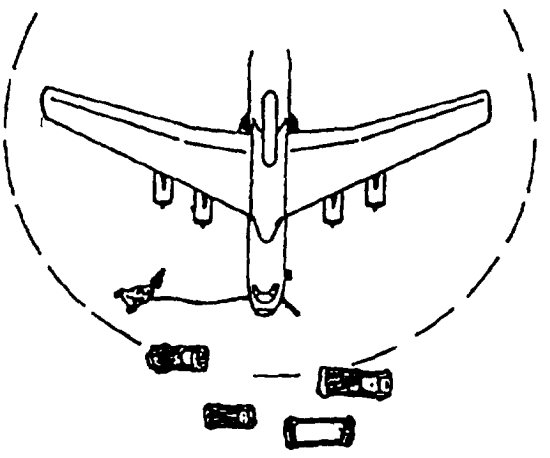
THE CIRCLE OF SAFETY IS A CIRCULAR AREA EXTENDING TEN FEET BEYOND WING TIPS, NOSE, AND TAIL OF AN AIRCRAFT. ALL VEHICLES WILL BE **PROHIBITED** WITHIN THE CIRCLE OF SAFETY EXCEPT THOSE ABSOLUTELY ESSENTIAL FOR ACCOMPLISHING THE MISSION. GUIDES WILL BE USED.

Figure 4-21.—Circle of safety.

In addition to flight-line safety rules, the following rules are required when the aircraft reaches its destination:

- Do not remove restraint devices or start vehicles until told to do so by the loadmaster.
- Move only in the direction straightaway from the front and the rear of the aircraft and at least 50 feet away before turning right or left. Also, move at least 300 feet from the aircraft before stopping.
- During an engines-running offload, passengers other than equipment drivers must exit the aircraft for safety purposes before the vehicles and cargo offloading can begin.

The aircraft loadmaster is the primary authority on any questions that may arise pertaining to the aircraft. This includes changing a planned load or changing the means of debarking from the aircraft. All personnel must cooperate fully with the aircrew at all times. If anything is unclear, call upon the unit embarkation staff for an explanation.



When parking motor vehicles on the flight line, they must be parked in front of the aircraft, parallel to the wing axis, to eliminate the possibility of striking an aircraft if rolled backward or forward. When aircraft engines are running or about to be started, only vehicles essential to engine operations shall be in the area. Minimum distance to any point of the aircraft will be 25 feet. Vehicles should be parked in such a manner that departure from the area may be made without backing. Vehicles must not back in the immediate direction of any aircraft except as authorized in certain loading/unloading or fueling operations. In these cases, guides will be posted, with bumper chocks to prevent vehicles from backing into the aircraft. Anytime the vehicle operator leaves the vehicle, the ignition must be turned off, key left in lock, the parking brake set, and the transmission placed in low gear. Vehicles with automatic transmission must have the transmission placed in "park" position. Between sundown and sunup, lights shall be left in the "park" position.

Figure 4-22.—Motor vehicle parking restrictions near aircraft.